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ABSTRACT

This report uses data from the National Longitudinal Transition Study of Special Education Students (NLTS) to examine four dimensions of school performance: (1) student engagement in their education, as measured by the average number of days of school missed in a year; (2) student learning, as indicated by their grade point averages, receipt of failing grades, and teacher-reported reading and mathematics grade levels; (3) in-class behavior, as measured by teacher reports of students' attention to educational tasks and the appropriateness of their behavior in class; and (4) school completion, as measured by whether students persisted in school or dropped out. After an overview chapter, Chapter 2 summarizes aspects of the NLTS data, sample, and analytic techniques. Chapter 3 presents descriptive information on secondary school performance. Chapter 4 discusses the hypothesized relationships between selected indicators of school performance and various characteristics of students with disabilities, their households, their school programs, and their school characteristics that are illustrated in the NLTS conceptual framework. The subsequent chapter presents the results of multivariate analyses that identify the relationships between selected performance indicators and factors hypothesized to contribute to them. The concluding chapter summarizes findings. Supplemental statistical tables are appended. References accompany each chapter. (DB)

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BEYOND THE REPORT CARD: THE MULTIPLE DIMENSIONS OF SECONDARY SCHOOL PERFORMANCE OF STUDENTS WITH DISABILITIES

A Report from the National Longitudinal Transition Study of Special Education Students

December 1993

Prepared for:

The Office of Special Education Programs
U.S. Department of Education

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National Longitudinal Transition Study

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Prepared for:

The Office of Special Education Programs
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Prepared by:

Mary Wagner
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1 FOCUSING ON STUDENT OUTCOMES

Few discussions of the status of education in the 1990s avoid reference to educational outcomes, which are "the results of interactions between students and the educational system" (Ysseldyke, Thurlow, and Gilman, 1993)—students' knowledge and skills and their achievement of marker events or status's, such as completing high school. Concerns that outcomes are poor drive moves to reform educational structures and instructional practices and to set higher standards for student achievement. Concerns that they are poorly measured drive the current emphasis on revamping assessment practices. Concerns that we emphasize the wrong ones drive debates regarding what we want for our students, what they are to learn, and how differences in students' goals and abilities can be accommodated in outcome-oriented education.

The consensus that has emerged over the past decade regarding the importance of attending to what education produces is perhaps most clearly embodied in the national education goals, established in September 1989 by then President Bush and the nation's governors. The adoption of the six national performance goals placed the topic of outcomes at the heart of the educational reform agenda. By addressing issues such as graduation rates and achievement of world-class standards in core subject areas, the national goals focused attention on the contribution of strong student performance to our nation's future well-being (National Education Goals Panel, 1991).

The need for a comprehensive look at outcomes also has been recognized for students with disabilities. Whereas much energy in the past two decades has been directed toward ensuring that students with disabilities have access to a free and appropriate public education, questions now are being raised about what students are achieving as a result of their education's (National Council on Disabilities, 1993).

Data on how students perform have played a key role in focusing the educational policy agenda on student outcomes. For example, the decline in standardized test scores among students in the general population has been widely cited as an indicator of the failure of our education system (National Commission on Excellence in Education, 1983). For students with disabilities, the limitations of focusing only on access to education have been reinforced by the findings from numerous follow-up studies that many young people with disabilities do not finish high school and achieve limited success as young adults (Sitlington, Frank, and Carson, 1993; Wagner, Newman, D'Amico, Jay, Butler-Nalin, Marder, and Cox, 1991; Edgar, Levine, and Maddox, 1986; Hasazi, Gordon, and Roe, 1985; Mithaug and Horiuchi, 1983).

Data convey the bad news about student performance, but they also are being used to monitor progress toward improving the situation. Administrators, policymakers, practitioners,

advocates, and parents need good information as they chart a future course for children and the education system that serves them. The National Education Goals Panel was created to assemble information that measures progress toward achieving the national goals. The Goals Panel has identified indicators, such as scores from the National Assessment of Educational Progress (NAEP), that can be used to assess progress toward improved outcomes for America's students. However, despite a plethora of statistics regarding the general population of students, the panel has concluded that better indicators of student performance are needed (National Education Goals Panel, 1991).

Even less information has been available regarding the performance of students with disabilities. Students in special education have been excluded routinely from many federal educational data collection efforts; thus, little information exists nationally on school outcomes for these students (McGrew, Thurlow, Shriner, and Spiegel, 1992; National Council on Disability, 1993). A similar lack of information for national policymaking was apparent regarding the postschool outcomes of young people with disabilities.

Responding in part to the absence of information about what happens to students with disabilities in secondary school and in their postschool years, Congress directed the Secretary of Education to conduct a longitudinal study of "the educational progress of students with disabilities while in special education" and "the occupational, educational, and independent living status of students with disabilities after graduating from secondary school or otherwise leaving special education" [U.S.C. sec. 1418 (e)(2)(A)]. In 1985, under contract to the Office of Special Education Programs, SRI International began to develop the design, sample, and data collection instruments for the National Longitudinal Transition Study of Special Education Students (NLTS). Under a separate contract, SRI initiated the study in 1987.

Previous reports from the NLTS have presented findings on the outcomes of students with disabilities in the early years after leaving high school. These reports have discussed outcomes in the areas of employment, residential independence, and postsecondary education (Wagner et al., 1991; Wagner, D'Amico, Marder, Newman, and Blackorby, 1992). Earlier NLTS analyses also examined some important aspects of students' secondary school programs and performance (Wagner, 1991a). However, these analyses were based only on the students' most recent year in high school; as the longitudinal study has continued, more complete data on students' school programs and performance have become available.

The findings from the NLTS that are presented in this report constitute the most comprehensive information currently available on the high school performance of students with disabilities in regular secondary schools; these students were 92% of all students with disabilities in special education at the secondary level.* The report focuses on several important dimensions of secondary school performance and examines the interrelationships among them and their relationships to other individual, family, and school factors. We

* School programs and performance of the 8% of students with disabilities who attended special schools have been described previously by the NLTS (Wagner, 1991b).

intentionally incorporate findings from earlier NLTS work on school performance, using more recent and complete data to reconsider earlier conclusions and to extend our understanding of this important aspect of the school experiences of students with disabilities.

Findings from the NLTS are based on data for more than 8,000 youth who were ages 13 to 21 and in special education in secondary schools (grades 7 through 12 or ungraded programs) in 1985-86. The sample is nationally representative and permits generalizations to the population of students with disabilities as a whole, as well as to students in each of the 11 federal disability categories separately (see Chapter 2 for a more detailed discussion of the NLTS and its sample).

A Conceptual Framework of the Transition Process

The work of the NLTS has been guided by a conceptual framework that places students' school performance in the context of their broader experiences in making the transition from secondary school to adult roles and responsibilities. The framework, as depicted in Figure 1-1, spans several years of adolescence and early adulthood, encompassing experiences both in high school and in the years immediately afterward.

In this report, we focus on student outcomes of education (Box D).* This attention to student performance is warranted by its importance as a key outcome of the educational process, but also by the recognition that school outcomes are themselves contributors to the ability of students to achieve the outcomes they desire in the postschool years (a subject of other NLTS reports).

We describe four dimensions of school performance, each measured by one or more indicators. They are:

- Student engagement in their education's, as measured by the average number of days of school missed in a year.
- Student learning, as indicated by their grade point averages, receipt of failing grades, and teacher-reported reading and mathematics grade levels.
- In-class behavior, as measured by teacher reports of students' attention to educational tasks and the appropriateness of their behavior in class.
- School completion, as measured by whether students persisted in school or dropped out.

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* Findings for employment during secondary school, social activities, and independence, the other student outcome indicators listed in the conceptual framework, have been reported on previously (D'Amico, 1991; Newman, 1991). Social activities, which include membership in groups and frequency of seeing friends outside of school, are examined in Chapter 5 of this report for their possible relationships to school performance.

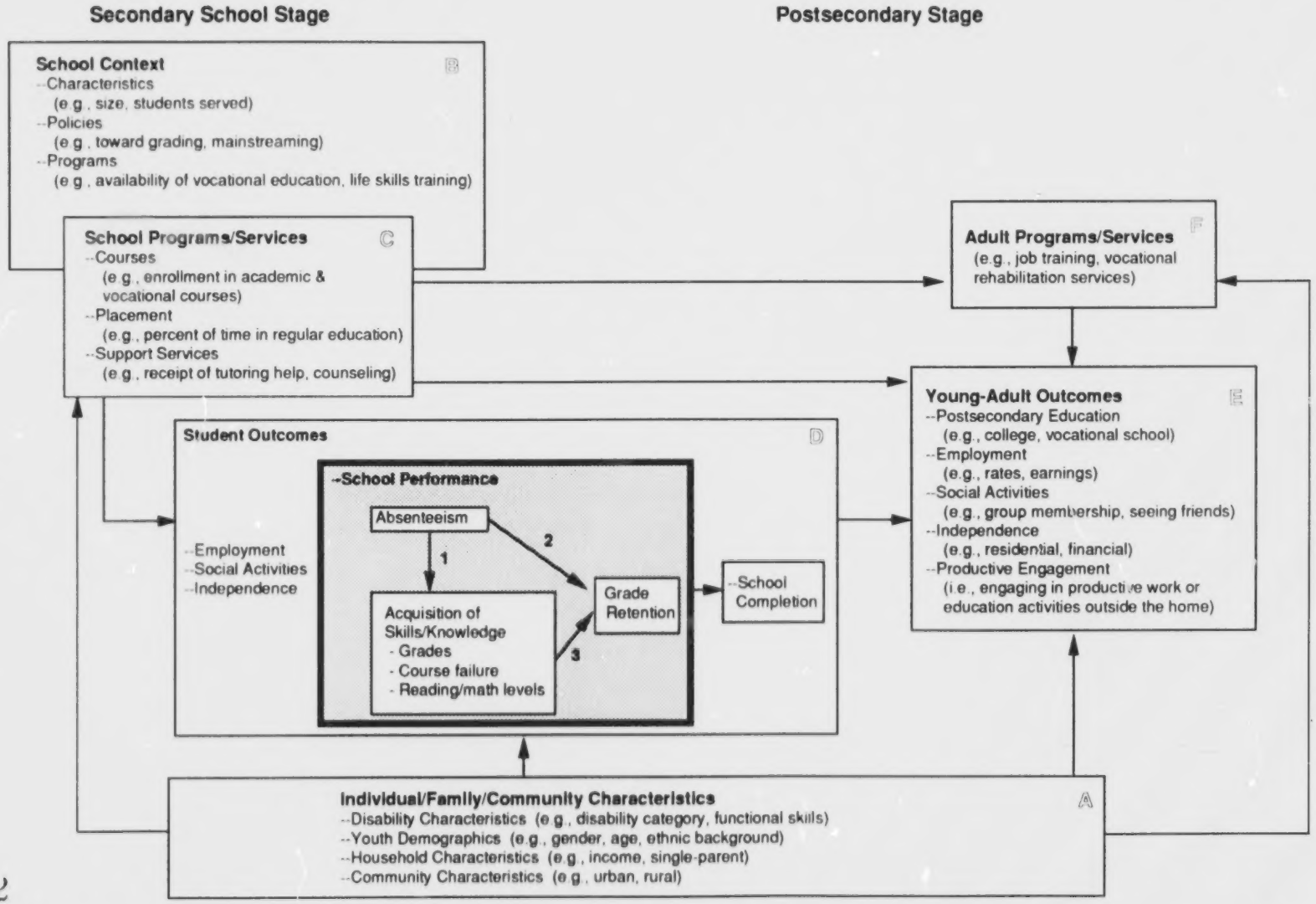

FIGURE 1-1 CONCEPTUAL FRAMEWORK OF TRANSITION EXPERIENCES AND OUTCOMES OF YOUTH WITH DISABILITIES

The NLTS conceptual framework is compatible with other recent work on outcomes for students with disabilities. The National Center on Educational Outcomes (NCEO) has recently engaged in an extensive consensus-building process to develop a model of outcomes for students completing school and indicators of those outcomes that it sees as appropriate for all students in today's schools (Ysseldyke, Thurlow, and Gilman, 1993). Several of the outcome indicators measured by the NLTS are also part of the NCEO model, including absenteeism and school completion status. The NCEO model also identifies academic and functional literacy as an important outcome area. NLTS indicators for this area are grade point average and the receipt of failing grades.

Despite the apparent consensus on broad areas of outcomes for secondary school students, the education field is much less sanguine about measuring student performance. Although some measures are fairly straightforward, such as the number of days students are absent from school, many others are subject to wide variability in definition and application and to considerable measurement error. For example, the dropout rate has been various defined, yielding cohort rates, event rates, and status rates (Kaufman, 1992). Course grades and grade point averages (GPAs) are even more ambiguous.

In one sense, grades serve as an evaluation of the degree to which students have mastered the material in a given class. An average of all of the youth's grades is intended to be a general barometer of her/his scholastic competence. Some believe that this "feedback loop" is an integral and necessary part of the educational process. However, grades also deliver messages to youth that may exceed an evaluation of coursework to become a more general assessment of the youth's overall worth as a student (Anderson, 1990).

As teacher-assigned values, grades are subjective assessments of performance. Many factors in addition to content mastery play a role in their determination. Effort, attendance, improvement, behavior, previous work, and biases all can influence grades. Indeed, there is little consensus as to how much these various factors are or should be weighted (Schwager and Balow, 1990). All of this is independent of natural variation in grading standards between teachers, which also is substantial (Holmes, 1989). Variation in grading practices has led some critics to claim that grades are not useful because they do not have specific instructional or curricular implications, and that it is impossible to reach consensus on what a given grade means. Proponents, however, claim that when used correctly, as one piece of information, they are helpful indicators of student learning.

The controversy surrounding grades extends beyond their measurement and meaning to their use. For example, some policymakers interested in uniform and high standards believe that receipt of a passing grade must indicate adequate mastery of a course's objectives; failure to master content should result in a failing grade. Others argue that one should not fail students if they have demonstrated interest and exerted some effort and that the psychological effects of failure on self-esteem, motivation, and future performance outweigh the benefits of having an absolute standard of performance (Alpert and Dunham, 1986; Gottfredson, 1988;

Schellenberg, Frye, and Tomsic, 1988). At the secondary school level, the grading stakes are even higher in that grades are a key factor in postsecondary school enrollment decisions and, therefore, can be an important influence on the postschool choices open to students.

All of these issues become more complicated when we consider youth with disabilities. Research suggests that youth with disabilities are subject to a different set of expectations than are their peers in the general population (Rojewski, Pollard, and Meers, 1992). For example, several studies have found evidence that special education and regular education teachers often use different criteria in assigning grades.

Dissatisfaction with current ways of measuring student performance has led to a considerable investment in developing new, "authentic" assessment tools. Portfolio assessment methods and tests that calibrate students' higher-order-thinking and problem-solving skills are being developed and pilot-tested in a variety of content areas and school systems. However, until the fruits of these endeavors are realized, we are left with indicators such as those listed above.

This report describes the levels of these indicators of student performance at each grade level, and cumulatively for the four grade levels of high school.* Performance indicators are presented for students overall and for those who differ in their primary disability category, as assigned by the school or district they attended in 1985-86. We also describe performance for students with disabilities who differ in gender and ethnic background, and in socioeconomic status as measured by their annual household income. These factors were selected for descriptive analyses because they have been found repeatedly in research to distinguish the school experiences of young people with disabilities.

We go beyond this descriptive analysis, however, to address the interrelationships between school performance and the many other factors highlighted in Figure 1-1. We use multivariate analytic techniques to identify significant relationships between school performance and individual and household characteristics beyond those featured in descriptive analyses (Box A), characteristics of students' schools (Box B), and aspects of their school programs (Box C).

Specifically, these descriptive and explanatory analyses address the following questions:

- **How did students with disabilities perform in secondary school?** What was their rate of absenteeism? How did they behave in class? What level of ability did they exhibit in the key subject areas of reading and mathematics? What grade point averages did they earn and with what frequency did they fail courses? What proportion of students with disabilities dropped out of secondary school?

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* Any students with school performance data for a given grade level are included in the statistics for that grade level, whether or not they completed school or had data for other grade levels (see Chapter 2).

- **Which students had particular difficulties with school performance?** How did performance vary for students who differed in disability classification, functional skills, gender, or ethnic background?
- **How did characteristics of students' households relate to their school performance?** What were the relationships between school performance and household income or composition? Did parental involvement in their children's education make a difference?
- **How did student behaviors relate to school performance?** Did students' social activities influence their school performance? To what extent was their in-class behavior reflected in their grades?
- **What were the characteristics of school programs that helped students with disabilities succeed?** What relationships existed between course choices and performance? Did placement make a difference in engagement in school, grades, or rates of school completion?
- **What kinds of schools helped students with disabilities succeed?** To what extent did student performance vary with differences in their school environment (e.g., school climate or size)?

Whenever possible, we compare our findings for students with disabilities with available information on secondary students in the general population.

Overview of the Report

Chapter 2 summarizes aspects of the NLTS data, sample, and analytic techniques that are relevant to the findings in this report. Chapter 3 presents descriptive information on secondary school performance as measured by the indicators listed earlier in this chapter. Chapter 4 discusses the hypothesized relationships between selected indicators of school performance and various characteristics of students with disabilities, their households, their school programs, and their schools that are illustrated in the NLTS conceptual framework. The subsequent chapter presents the results of multivariate analyses that identify the relationships between selected performance indicators and factors hypothesized to contribute to them. The concluding chapter summarizes what we have learned about the secondary school performance of students with disabilities through the National Longitudinal Transition Study.

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2 MEASUREMENT AND ANALYSIS CONSIDERATIONS

The NLTS is designed to address a number of descriptive and explanatory research questions for diverse audiences using multiple sources of data and a variety of analytic approaches reported in different formats. This chapter provides an overview of methodological issues pertinent specifically to the analyses of secondary school performance reported here. For more information on the design, sampling, or measurement of the NLTS more broadly, see Wagner, Newman, and Shaver (1989) regarding data collection procedures for the first wave of NLTS data and Marder, Habina, and Prince (1992) for the second wave. Sampling issues are presented in greater detail in Javitz and Wagner (1990, 1993).

This chapter first describes the sources of NLTS data used in this report. We then discuss several measurement issues pertaining to variables constructed for the analyses whose findings are reported here. The several analytic subsamples used for various purposes throughout the report are then described, along with our approaches to weighting the NLTS data to generalize to the population of students with disabilities and to estimating standard errors to account for the stratified sample of the NLTS. Data used for comparisons of students with disabilities and the general population of students also are discussed. Finally, we describe important analysis and interpretation considerations, including grade-level samples, period effects, and statistical techniques.

Data Sources

Findings regarding the broad range of school program characteristics presented in this report are based on data derived from multiple sources:

- **Secondary school transcripts**. High school transcripts were sought for all sample students who attended secondary school after the 1986-87 school year.
- **School program content forms**. For students whose school programs were not recorded on transcripts, school program content forms were completed by teachers familiar with students' programs. These were sought in 1990 for the most recent school year for all students who had been in secondary school at all since the 1986-87 school year.
- **School record abstracts.** As part of 1987 data collection, local school staff abstracted school record information for students' most recent school year (either the 1986-87 or 1985-86 school year). For some students included in the analyses reported here, both school record abstracts for a single year and transcripts for more years were available. For other students, data from only the single year recorded on the school record abstract are available.

- **Student school program survey**. For all students still in school in the 1990-91 school year and for those students leaving school in the 1988-89 and 1989-90 school years who were classified as learning disabled, speech impaired, seriously emotionally disturbed, or mildly/moderately mentally retarded,* teachers were surveyed regarding their performance expectations for students and more detailed aspects of those students' school programs (this instrument is included in Marder, Habina, and Prince, 1992).
- **Parent/student telephone interviews**. In 1987, parents and, in 1990, parents and students (if the latter were able to respond for themselves) were administered a structured interview by telephone to obtain information on services received by students and outcomes in the areas of employment, education, and independence. Interview data also were the source for categorizing students according to gender, ethnic background, and household income for purposes of describing variations in school performance.

Measurement Issues

The subsequent analytic chapters of this report present information regarding the measurement of specific variables used in those chapters. However, several general points about NLTS measures used in multiple chapters also should be clear to readers as they consider the findings reported here.

Combining data from multiple sources. Variables used in the analyses reported here combine data from various of these sources. For example, determining whether a student took vocational education at a given grade level used data for that grade level, whether they came from transcripts, school content forms, or school record abstracts. See Wagner et al. (1991) for an analysis of issues related to combining data from various sources; results fail to provide evidence against maximizing the data by combining them from different sources when appropriate.

Categorizing students by primary disability category. Information about the nature of students' disabilities came from rosters of all secondary school students in special education that were submitted by school districts included in the study. In all tables in this report, students are assigned to a disability category on the basis of the primary disability designated by the student's school or district in the 1985-86 school year. Definitions of disability categories and criteria for assigning students to them vary from state to state and even between districts within states. Because we have relied on category assignments made by schools and districts, NLTS data should not be interpreted as describing students who truly had a particular disability, but rather as describing students who were categorized as having that disability by their school or district. Hence, descriptive data are nationally generalizable to students who were classified as having a particular disability in the 1985-86 school year.

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* The surveys in 1988 and 1989 were part of a special study done for students in these categories only.

Demographic characteristics. Findings in this report are provided for youth who differ in gender, ethnic background, and household income. For the majority of students, these measures were taken from interviews with parents in 1987. For a small number of students, interviews could not be completed in 1987 but were completed in 1990. For these students, demographic characteristics were obtained in the 1990 interviews. To the extent that characteristics were different between 1987 and 1990, some degree of measurement error is introduced for these variables, which may reduce the strength of association with other student experiences. Regarding ethnic background, only the categories of white, African American, and Hispanic had enough students to report findings for those categories separately. Students of other ethnic backgrounds are included in the samples of all students, of disability categories, of gender, and of household income, but are not reported separately by ethnic background.

Types of courses. Courses listed on students' transcripts were coded into course content areas using a modified version of the Classification of Secondary School Courses coding system developed for the National Center for Education Statistics (NCES) in 1982, and the Special Education Course Classification and Coding System developed for NCES and the National Assessment of Vocational Education. Those systems permit distinguishing courses at a fine level of detail. However, to take advantage of that level of detail, course catalogs giving descriptions of course content, prerequisites, or skill levels would be required. Obtaining catalogs from the almost 2,000 schools attended by NLTS sample members was infeasible. Therefore, course types were coded directly from course titles on transcripts, which required grouping courses for analysis into fairly gross categories (e.g., English, social studies).

Placement. Whether courses were taken in regular education or special education settings is a critical element in these analyses. In many cases, special education classes were designated clearly on transcripts. Nevertheless, school staff were asked to annotate each student's transcript so that the placement of each course was clear. (See Marder, Habina, and Prince, 1992, for copies of annotation instructions and all other data collection instruments for the second wave of NLTS data collection.)

School completion. Some aspects of school experiences are distinguished for students on the basis of their mode of school leaving—graduating, dropping out, or "aging out" by staying in school until the maximum allowable age without earning credits needed for graduation. School-leaving status was determined from school reports when these were available. In the absence of a complete school record or school-leaving report from a school, parent or student reports were used. Other analyses of NLTS data revealed a high level of agreement between parent/student reports and school reports when both sources of information about school-leaving status were available (Wagner et al., 1991, Appendix C).

Analytic Subsamples

The analyses in this report are based on data for three subsamples of NLTS students, which correspond to data sources or combinations of them: data related to performance and course-taking, teacher reports, and estimates of dropout rates.

Performance. The first subsample is designed to maximize information regarding students' performance in secondary schools. Students in this subsample were required to satisfy three conditions:

- They were enrolled in a regular (not special) secondary school in their most recent school year. The type of school attended was reported in a school background survey for each school attended by sample students.
- Data were available from a transcript, school record abstract, and/or school content form for either an ungraded program or grade levels 9, 10, 11, and/or 12.
- Their age while in school was less than 24 years.

A sample of 4,828 students met these criteria. However, not all students appear in any single analysis, largely because of the grade-level cohorts that are the basis of many of the analyses. Of the 4,828 students, fewer than 3,000 had data for any single grade level, and only about 2,200 had data for all four grade levels of high school. In other words, a core sample of approximately 2,200 students had data available for 4 full years. They are included in each grade-level cohort, supplemented by several hundred other students who had data available, usually for that grade level alone. Other analyses may further reduce the samples in a grade level by focusing only on students with particular characteristics (e.g., grades received in special education classes for those who took them).

Teacher reports. The second subsample stemmed from teacher reports of students' secondary school programs and supports, as well as teacher perceptions of students' behavior in school. Students in this subsample were required to satisfy the following conditions:

- They were enrolled in a regular (not special) secondary school in their most recent school year.
- Their age while in school was less than 24 years.
- Their age in 12th grade or in the last year of an ungraded program was between 17 and 23.
- Student school program survey data were available for either 12th grade or an ungraded program.

In all, 720 students met the criteria for this subsample.

Dropout estimates. The third subsample was focused on producing the most accurate account of the number of dropouts at each grade level as well as cumulatively. Students in this sample were required to satisfy the following conditions:

- They were enrolled in a regular (not special) secondary school in their most recent school year.
- Their age while in school was less than 24 years.
- Data were available from a transcript, school record abstract, and/or school content form for either an ungraded program or grade levels 9, 10, 11, and/or 12.
- They graduated, aged out, dopped out, were suspended or expelled during the wave 2 data collection.

A sample of 4,399 students met these criteria.

Weighting the NLTS Data

In describing secondary school performance of students with disabilities, we generally report percentages of students with a particular status or experience (e.g., the percentage failing classes in 9th grade). Percentages are weighted to represent students nationally; they are not percentages of the sample, but estimates for the population of students with disabilities as a whole and for students in each of 11 federal special education disability categories. Students were weighted to represent all students enrolled in special education in the 1985-86 school year. In other words, rather than counting each student in the NLTS equally in calculating percentages, each student's value for a variable is weighted proportionate to the number of students like him/her in the full population of students with disabilities nationally. Hence, for example, values for students with learning disabilities are weighted more heavily than those for students with visual impairments when discussing students as a group because of the significantly greater number of students with learning disabilities in the population as a whole.

Table 2-1 illustrates the concept of sample weighting and its effect on percentages or means that are calculated for students with disabilities as a group. In the example in Table 2-1, 10 students are included in a sample, 1 from each of 10 disability groups, and each has a hypothetical value regarding whether that student failed a class (1 for yes, 0 for no). Three students failed a class, which would result in an unweighted sample percentage of 30% having failed a class. However, this would not accurately represent the national population of students with disabilities because many more students are classified as learning disabled or mentally retarded than as orthopedically or other health impaired, for example. Therefore, in calculating a population estimate, we apply weights in this example that correspond to the proportion of students in the population that are from each disability category (actual NLTS weights account for disability category, age, and several other aspects of students and the districts from which they were chosen, as specified in Javitz and Wagner, 1990). The sample weights for this example appear in column C. Using these weights, the weighted sample percentage is 67%. The percentages in all NLTS tables are weighted population estimates (similar to the 67% in Table 2-1), whereas the sample sizes are the actual number of cases on which the weighted estimates are based (similar to the 10 cases in column A).

Table 2-1

EXAMPLE OF WEIGHTED PERCENTAGE CALCULATION

Disability Category	A Number in Sample	B Failed a Course*	C Weight for Disability Category	D Weighted Value for Category
Learning disabled	1	1	5.6	5.6
Emotionally disturbed	1	1	1.1	1.1
Speech impaired	1	0	.3	0
Mentally retarded	1	0	2.4	0
Visually impaired	1	0	.1	0
Hard of hearing	1	0	.1	0
Deaf	1	0	.1	0
Orthopedically impaired	1	1	.1	.1
Other health impaired	1	0	.1	0
Multiply handicapped/deaf-blind	1	0	.1	0
TOTAL	10	3	10	6.7
	Unweighted percentage = 30% (Column B total divided by Column A total)		Weighted percentage = 67% (Column D total divided by Column C total)	

*Yes =1; No = 0

NLTS sample weighting involved deriving weights for all students for whom data were available in 1987 from parents or school records, as described in Javitz and Wagner (1990). Wave 1 weights provide the best estimate of the characteristics of the whole population of students with disabilities who had been secondary school special education students in the 1985-86 school year.

To reweight the subsample of 4,828 students used in the analyses of grades and absenteeism, the 4,399 used in the school completion analyses, and the 720 used in analyzing teacher reports of student behavior to represent students as a group, we first identified the group of students we wished to represent--students who (1) were enrolled in special education in the 1985-86 school year, (2) were enrolled in a regular (not special) school in the 1985-86 or 1986-87 school year, (3) were in 9th grade or higher when they left school, and (4) were age 23 or younger while in secondary school. The universe for the teachers' perceptions subsample also represented students who (1) were in an ungraded program and (2) were between the ages of 17 and 23 when they left school. This group of 5,442 students (3,915 for the teacher school programs analysis), weighted with their wave 1 weights, provided the best picture available of the characteristics of the population of students to which the subsamples of students should generalize.

We then used the group of 5,442 students (or 3,915 students for the teacher school program analysis) and their wave 1 weights to calculate the following characteristics of the population as of 1987:

- **Disability**—grouped using the 11 federal special education disability categories: learning disabled; seriously emotionally disturbed; speech impaired; mentally retarded; visually impaired (partially sighted or blind); hard of hearing; deaf; orthopedically impaired; other health impaired; and multiple (multiply impaired or deaf/blind). Disability category was designated by schools or districts from which students were sampled originally.
- **Age**—the categories were students born in the years 1970-72, 1967-69, and 1966 or before. Age was determined from parent reports and/or school records.
- **Ethnic background**—grouped as African American, white, Hispanic, and a combined category for Native American/Alaskan Native, Asian/Pacific Islander, and other." In addition, there was a category for unknown ethnic background, which included "don't know," refusals, and any other missing data. Parent reports or, if parent interviews were missing, school records were the source of ethnic background data.
- **Gender**—as reported by parents or, if no parent interview was obtained, as found on school records.
- **Annual household income**—grouped as under $12,000, $12,000 to $24,999, and $25,000 or more. Those with incomes of $24,999 or less but otherwise unspecified were grouped with those with household incomes under $12,000. In addition, there was a category for those with missing information, which included those who responded "don't know," refused to answer, or indicated that the student was institutionalized, and any other missing values. Income was determined from parent reports.

The third step was to calculate weights for the subsamples of students so that they matched the demographic distributions of the 5,442 (or 3,915) students on the characteristics listed above. The weighting was accomplished by using Deming's algorithm, which iteratively modified the wave 1 weights for the students in each of the three subsamples until they generated demographic distributions that were very similar to those of the students used to estimate the population. Each disability category was weighted separately; the distributions of the smaller subsamples matched that of the larger sample within a fraction of 1%.

Estimating Standard Errors

Because the NLTS involves a sample of students with disabilities from which estimates are made for the broader population of students, it is important to determine the statistical variability of the population estimates—i.e., how precisely are we estimating from our sample the characteristics of the population to which the NLTS generalizes? If, for example, weighted NLTS data indicate that 30% of the population of students with disabilities failed one or more courses in 10th grade, we need to know how close that estimate is to the true level of course

failure that would be measured for the whole population of students. A standard error indicates the precision of the estimates; standard errors are reported in all data tables in NLTS documents to permit readers to understand the range of variability of the estimates provided.

To elaborate, the standard error of the estimate of 30% course failure used as an example above might be 3%. In this example, we would be confident that, 95 times out of 100, the actual percentage of the national population of students with disabilities who failed a course in 10th grade would be 30%, plus or minus 1.96 times 3%, or between 24% and 36%. The width of this interval reflects the fact that the 30% estimate is based on only a sample of students, and the "luck of the draw" could result in our selecting proportionately somewhat more or fewer students who failed courses than in the national population.

Standard errors for the NLTS were computed with a procedure that differs somewhat from standard calculation routines. Standard routines assume a simple random sample, whereas the NLTS has a stratified cluster sample, which increases the standard errors of estimates compared with a simple random sample. In addition, the reweighting of 1990 data introduced a small amount of additional variability.

Pseudo-replication is widely accepted as a variance estimation technique for databases that have the sample characteristics of the NLTS. However, it is not cost-effective for estimating the standard errors of the thousands of variables and subpopulations tabulated in the numerous NLTS reports. Therefore, pseudo-replication was conducted on a limited number of variables to calibrate a cost-effective approximation formula. The procedures used in this calibration are described in Javitz and Wagner (1990). These procedures generated the standard errors reported for percentages of students with particular experiences at a given point in time (e.g., the percentage of students enrolled in vocational education in 12th grade, the percentage of students receiving tutoring assistance in 10th grade).

Analysis Issues and Strategy

Interpreting Grade-Level Samples

Many of the findings in this report are presented in conjunction with grade-level designations. That is, we present the average days absent of students in 9th grade, 10th grade, etc. Further, we generally present these grade-level data in a single table for a particular measure. However, each grade level constitutes a different subsample. The proper interpretation of grade-level analyses considers each grade level as a separate cohort. The findings for each grade level and the differences between grade levels are accurate for each grade-level cohort, but should not be interpreted as a trend observed for particular students as they move from grade level to grade level. As an example, we might observe an improvement in student performance when comparing the cohort of 12th-graders with the cohort of 9th-graders, which might reflect the different composition of the two cohorts (dropouts with poor

performance were no longer represented in the 12th-grade cohort), rather than a pattern of improving performance among students who stay in school the entire 4 years.

We chose the grade-level cohort approach to analysis, rather than concentrating on trends for students who stay in school for the full 4 years, for several reasons. First, a large percentage of students with disabilities drop out of school; eliminating those students from analysis would limit what we could learn about the effectiveness of school programs for students with disabilities. Second, we wished to make grade-level estimates as accurately as possible. Thus, we maximized the sample size for each cohort by including students who had any information for a particular grade level, irrespective of whether they had data available in any other grade level. That is, we may have had course grades for some students only in 10th grade and not in any other grade. Thus, different subsamples comprise each grade level. The separate cohorts have different characteristics because they are independently derived, as well as because each subsequent cohort is "purged" of the dropouts who left school before that grade level.

Table 2-2 describes the characteristics of each grade-level cohort. There were no dramatic or statistically significant aggregate differences between grade levels with respect to disability and demographic characteristics. However, there were marginal shifts over time. For example, there were proportionately more students with learning disabilities in 12th grade than in 9th grade, and proportionately fewer students with serious emotional disturbances or mental retardation. There were similarly small shifts in the distributions of ethnic background and household income. There were proportionately more white students and students from families earning $25,000 or more annually. Again, none of these differences were statistically significant.

Despite only marginal shifts in the aggregate, these small changes can be proportionately large for a given disability or demographic category. For example, students with serious emotional disturbances change only 2 percentage points in their representation in the aggregate disability distribution, yet that is a relatively large proportion of this small category of students. Overall, approximately 50% of such students do not complete school. Thus, it is important to recognize that differences exist between the grade levels on dropout-related variables. In this report, we stress this point where it is relevant.

Student School Program Survey Analyses

The NLTS survey of teachers regarding students' school programs allows the exploration of a range of critical areas inaccessible through analyses of transcripts. In this report, we have analyses of supports offered to students and teaching personnel as well as students' behavior in different settings. An important consideration of these data, however, is that they focus largely on 12th-graders or students not assigned to grade levels. Thus, they are likely to be different from those for students in the earlier grades, a proportion of whom would be dropouts.

Table 2-2

STUDENT BACKGROUND CHARACTERISTICS, BY GRADE LEVEL

Characteristic	Grade Level				Not Assigned to Grade Level
	9th	10th	11th	12th	
Disability category (percent)					
Learning disabled	61.6 (1.8)	61.5 (1.8)	63.9 (1.8)	64.8 (1.7)	30.8 (3.9)
Emotionally disturbed	9.7 (1.1)	9.7 (1.1)	8.2 (1.1)	8.0 (1.0)	7.1 (2.2)
Speech impaired	4.2 (.7)	4.1 (.7)	4.2 (.8)	4.2 (.7)	.6 (.7)
Mentally retarded	19.4 (1.5)	19.5 (1.5)	18.5 (1.5)	18.0 (1.4)	52.9 (4.2)
Visually impaired	.6 (.3)	.6 (.3)	.6 (.3)	.6 (.3)	.4 (.6)
Hard of hearing	1.0 (.4)	1.0 (.4)	1.0 (.4)	1.0 (.3)	.6 (.6)
Deaf	.4 (.2)	.5 (.3)	.5 (.3)	.5 (.2)	.2 (.4)
Orthopedically impaired	1.2 (.4)	1.2 (.4)	1.2 (.4)	1.2 (.4)	1.1 (.9)
Other health impaired	1.3 (.4)	1.3 (.4)	1.3 (.4)	1.1 (.4)	1.6 (1.0)
Multiply handicapped	.6 (.3)	.7 (.3)	.6 (.3)	.6 (.3)	4.2 (1.7)
Deaf/blind	<.1 (.1)	<.1 (.1)	<.1 (.1)	<.1 (.1)	.4 (.5)
Average age (years)	15.1 (<.1)	16.1 (.1)	17.1 (<.1)	18.1 (<.1)	18.5 (.2)
Gender (percent)					
Male	68.3 (1.7)	67.8 (1.8)	68.8 (1.8)	68.8 (1.6)	66.9 (4.0)
Female	31.7 (1.7)	32.2 (1.8)	31.2 (1.8)	31.2 (1.6)	33.1 (4.0)
Ethnic background (percent)					
White	67.4 (1.9)	68.5 (1.9)	71.4 (1.9)	71.4 (1.7)	53.5 (4.5)
African American	22.4 (1.7)	21.9 (1.7)	19.6 (1.6)	19.7 (1.5)	24.3 (3.9)
Hispanic	7.7 (1.1)	7.1 (1.1)	6.6 (1.0)	6.2 (.9)	17.3 (3.4)
Annual household income (percent)					
Less than $12,000	24.3 (1.8)	23.8 (1.9)	23.4 (1.9)	21.6 (1.7)	24.4 (4.3)
$12,000 - $24,999	23.4 (1.8)	22.6 (1.8)	22.6 (1.8)	22.2 (1.7)	44.4 (4.9)
$25,000 or more	52.3 (2.1)	53.6 (2.2)	54.0 (2.2)	56.3 (2.0)	31.1 (4.6)
n	2,979	2,860	2,774	3,282	483

Standard errors are in parentheses.

Period Effects

When research projects are longitudinal, such as the NLTS, it is possible that external factors might influence the findings, independent of issues pertaining to the study. These are often referred to as period effects. Period effects pose a threat to the validity of longitudinal research since researchers run the risk of misinterpretation or making false attributions of causality. An obvious example of this issue is the changes in minimum wage laws over the course of a study and the attribution of higher wages to the improved success of the individual, rather than to changes in the law.

The issue of period effects is germane to this report on school performance. The mid- to late 1980s were a time of great debate and policy activity in American education. It is possible, for example, that some of this activity affected student performance through increased graduation requirements or time spent in general education settings. Thus, a 9th-grade experience in 1985 might differ from one in 1988, a difference that would argue for separate analyses.

We investigated this issue for a series of school performance variables described in this report (see Figure 2-1). We found no consistent pattern or trend in changes in performance associated with calendar year. For example, the mean grade point averages associated with particular grade levels fluctuated across calendar years but did not exhibit any clear trends. Thus, throughout this report, we treat grade-level experiences equivalently regardless of the year in which they occurred. That is, 10th-graders in 1985 and 1988 are analyzed together as a single group.

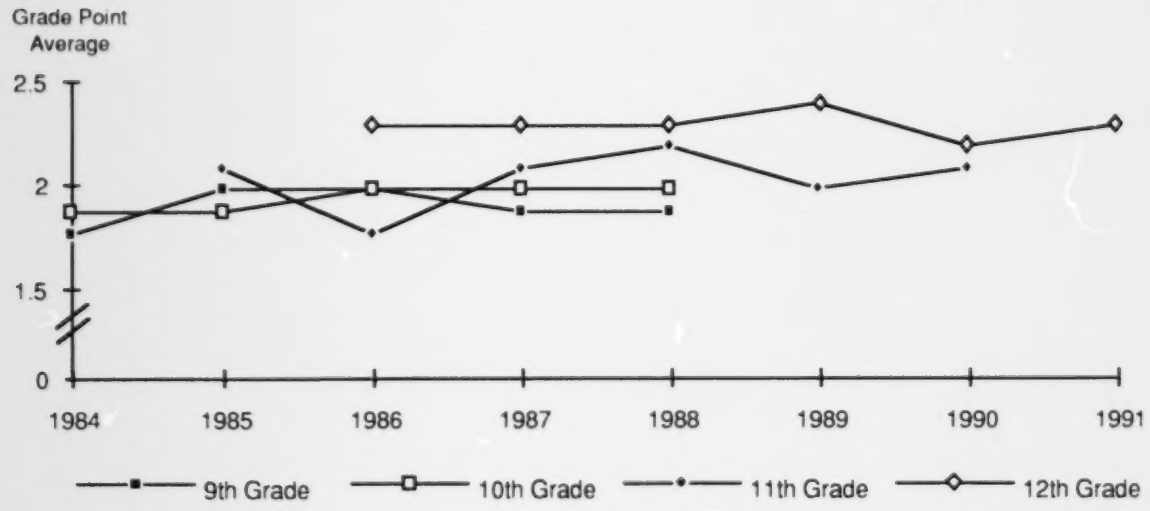

FIGURE 2-1 GRADE POINT AVERAGE, BY CALENDAR YEAR AND GRADE LEVEL

Multivariate Analysis Techniques

Most of the descriptive analyses presented in this volume are based on crosstabulations of two or three variables. However, interrelationships among variables limit our ability to disentangle the independent relationships among intercorrelated independent variables and an outcome of interest. Multivariate analysis techniques have been used when our purpose was this identification of independent relationships. Multivariate analysis is an invaluable analytic technique in the social sciences precisely because of its ability to disentangle the separate impacts of multiple predictor variables. Suppose, for example, that we were interested in knowing the relationships that household income and minority status have to students' school performance. Because household income and minority status are themselves interrelated, we would need some way of distinguishing the separate effect of each factor. Multivariate analysis techniques perform this function. Ordinary least squares regression analysis and logit analysis are the two techniques that have been used in this volume; each is discussed below.

Ordinary Least Squares Regression Analysis

Ordinary least squares regression analysis is used to consider the relationships of a variety of independent variables to a continuous dependent variable, such as the average number of days students were absent from school in their most recent school year. Ordinary least squares regression analysis is based on the following form of model:

$$Y = a + b_1X_1 + b_2X_2 + e \qquad (1)$$

where:

Y is the outcome variable, which in this case we measure as the number of days a student was absent;

X_1 and X_2 are the independent variables. In this example, let us suppose that the first of these is the family's annual income and the second is coded 1 for those who are members of minority groups and 0 for nonminorities;

a, b_1, and b_2 are coefficients to be estimated; and

e is the error term, reflecting the fact that an outcome generally will not be completely determined by the included independent variables (i.e., there is a stochastic component to the relationship).

The coefficients, b_1 and b_2, represent the separate effects of household income and minority status, independent of the influence of the other. Specifically, b_1 represents the effect of household income on absenteeism, holding constant the effect of minority status (i.e., it represents the effect of family income among students who either were all minority or all nonminority), and b_2 represents the effect of being minority rather than nonminority among youth with equivalent household incomes. These coefficients can be readily interpreted as showing the amount by which the outcome is expected to change for each one-unit change in

the independent variable. Thus, if household income were measured in thousands of dollars, a student's absenteeism would be expected to change by amount b_1 for each $1,000 increase in family income.

Of course, other techniques also could have been used to sort out these separate impacts. A three-way crosstabulation (categories of grade point average by categories of household income by minority status), for example, also would be very informative and might be preferred in descriptive or exploratory work when our knowledge of the nature of the relationship between independent and dependent variables is weak. But the use of crosstabulations often will confront us with dwindling cell sizes for all but the simplest problems, and regression analysis generally yields significance tests that are substantially more powerful, in a statistical sense (i.e., we are more likely to reject the null hypothesis of no relationship when there really is a relationship).

The advantages of regression analysis can be fully realized, however, only if its underlying assumptions hold. Among these assumptions are that the equation correctly specifies the relationship between the independent and outcome variables and that the error term, e, has an expected value of zero and a constant variance. Although regression is robust in the face of violations of these assumptions, the case of dichotomous dependent variables gives rise to problems that are especially egregious for at least several reasons.

First, the assumption of linearity seems untenable. Regression techniques assume that the effect of each variable is constant throughout all of its own values and all values of the other variables. For example, in the equation above, it is assumed that the effect of household income, b_1, is the same for minority and nonminority youth and, further, that absenteeism is affected equally regardless whether the one-unit change in household income represents a difference between $10,000 and $11,000 or a difference between $50,000 and $51,000. Similarly, the difference between the expected days absent of minority and nonminority youth is estimated to equal b_2, regardless of whether we are evaluating the difference among youth from high-income or low-income households.

The assumption of linearity may hold at least approximately in many cases, and slight adjustments to a regression model (e.g., the inclusion of quadratic terms) can make necessary accommodations in many other instances. But in the case of dependent variables that are dichotomous, the linearity assumption seems especially untenable. Let us modify the example above by assuming that the outcome is a dichotomous variable coded 1 for youth who dropped out of high school and 0 for those who persisted (an analysis performed in Chapter 5). Using regression analysis in this case, we would be modeling the probability that a youth will drop out. Because a probability must be bounded between 0 and 1, we would expect that, in cases where the expected probability of dropping out is already very high or very low (e.g., because of values on other independent variables in the equation), even very large changes in the value of an independent variable can generate only very modest changes in the expected probability of dropping out. In other words, the effect of further changes in any

independent variable would have asymptotically diminishing effects as the value of the expected probability of dropping out approaches 0 or 1. This implies a violation of the linearity assumption, because regression analysis makes no such provision.

Second, expected values of the outcome may be out of range. One could conceivably end up with predicted values on the outcome variable that exceed 1 or that are less than 0, a nonsensical result.

Third, the assumption of constant variance does not hold. The assumption that the error term in the above equation has a constant variance is necessarily violated in the case of dichotomous dependent variables. Violation of this assumption is known as heteroscedasticity.

Logit Analysis: An Alternative to Regression

Fortunately, other techniques have been devised specifically for the multivariate analysis of dichotomous dependent variables. One used extensively in this volume is logit analysis. Logit analysis has been used in analyses of whether youth received failing course grades and whether youth dropped out of school rather than persisting (Chapter 5).

Logit analysis deals with the complications of nonlinearity inherent in regression analysis by transforming the outcome variable. Regression analysis models the *probability* of dropping out as a function of the independent variables. Logit analysis circumvents these problems by modeling the *log odds* of dropping out. The log odds, often denoted Z, is defined as:

$$Z = \ln [P/(1-P)] \qquad (2)$$

where P is the probability that the outcome occurs (for example, the probability that a youth drops out). As P approaches 1, Z approaches plus infinity and as P approaches 0, Z approaches minus infinity. In logit analysis, Z is then modeled as a linear function of the independent variables (X). Thus,

$$Z = a + b_1X_1 + b_2X_2 + e \qquad (3)$$

Using maximum-likelihood methods, the estimators for the coefficients in the above equation have desirable properties. But whereas coefficients estimated from regression analysis are easily interpretable, as already described, coefficients from logit analysis lack straightforward interpretation for at least two reasons.

First, the dependent variable is a log odds. The coefficients, b_1 and b_2, represent the expected change in the log odds of the outcome for a one-unit change in the independent variables. Few people have an intuitive sense for what a change in the log odds by amount b_1 means.

Second, effects on probabilities are nonlinear. We can greatly ease interpretability by converting changes in log odds into changes in estimated probabilities. But because Z is a nonlinear transformation of the probability of an outcome, the independent variables also are nonlinearly related to P. This means that there is no single answer to the question of how changes in the value of an independent variable affect the probability of dropping out. In other words, the effect of a one-unit change in an independent variable on the probability of dropping out depends on the initial value of the independent variable and on the values of all other independent variables in the equation.

One common approach to converting logit coefficients to changes in estimated probabilities, and the one followed throughout this volume, is to compute the expected values of Z when an independent variable is specified at two (or more) conceptually interesting values while using mean values on all remaining independent variables, next to convert these Z values to probabilities, and then to take the difference between the probabilities. For dichotomous independent variables, these two alternative values obviously would be 1 and 0 (i.e., the person has the attribute in question or does not); for continuous independent variables, one value above the mean and one below the mean might be used.

For example, using equation (3) above, we would first estimate the equation to derive coefficients a, b_1, and b_2. The impact of household income thus, represents the amount by which the log odds of dropping out is expected to change for a one-unit change in income; similarly, b_2 represents the amount by which the log odds of dropping out is expected to change for youth who are minorities rather than nonminorities. To convert the effect of minority status to an impact on predicted probabilities, we might substitute mean household income for X_1, use, alternately, 0 and 1 as the values of minority status, and compute the expected value of Z for each case by multiplying through the equation. Each of these Z values could then be converted to a predicted probability of dropping out [by solving for P in equation (2), above], and they then would represent, respectively, the predicted probability of dropping out for minority and nonminority youth whose families were of average income. The effect of minority status on dropping out at the mean value of income is given by the difference in these predicted probabilities.

We could evaluate the effect of household income very similarly, by substituting the mean value of minority status for X_2 (approximately .20 in our sample) and choosing alternate values of income in turn—say, 12 and 18 (assuming income is measured in thousands of dollars). We then would solve the equation for the two values of Z and convert these two into estimated probabilities. The difference between the two probabilities then would represent the effect on the probability of dropping out of changing household income from $12,000 to $18,000, at the

mean value of minority status. In each of the logit analyses presented in this volume, we present the estimated change in the probabilities, calculated as noted above, and the increment of the independent variable for which the change was calculated.

With this background information on the sample, the data, and the analytic approach in mind, we turn now to the task of describing secondary school performance of students with disabilities.

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3 THE PERFORMANCE OF STUDENTS WITH DISABILITIES IN SECONDARY SCHOOL

In this chapter, we turn to the complex issue of how youth with disabilities were succeeding in their educational programs. Previous NLTS work addressed several aspects of student performance for students with disabilities using a single year of data from student record abstracts (Wagner, 1991a). In this chapter, we revisit the issues of absenteeism, grades, grade retention, and school completion with the benefit of complete student transcripts for many students.* Using transcript data allows us to address these issues of performance over time more completely. In addition, we extend our look at student performance by investigating reading and mathematics skills achieved by a subset of students.† Further, we examine a behavioral dimension of performance by analyzing teacher ratings of students' in-class behavior regarding their observation of classroom norms and their attendance to the tasks of schooling.

In our analyses of student performance in secondary schools, we are guided by the conceptual framework shown earlier in Figure 1-1. The student performance component of that framework is elaborated in Figure 3-1. It posits a number of direct and indirect relationships among different aspects of student performance. Absenteeism, reading and mathematics abilities, and in-class behavior are hypothesized to have direct effects on grade performance, as well as both direct and indirect effects on the likelihood that students will drop out. We have organized the chapter to address each of these issues in succession. We begin with an assessment of absenteeism across the 4 years of high school, followed by a treatment of reading and mathematics abilities and teachers' ratings of in-class behavior, as contributors to grade performance. Following an analysis of grade point averages (GPAs) and course failure rates for students with disabilities, we consider the amount of time required for students to complete individual grade levels, as an indicator of grade retention. We then consider the rate at which students with disabilities dropped out of school. We conclude the chapter with a summary of the ways in which these performance measures relate to one another.

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* As noted in Chapter 2, each grade-level sample includes all students with data for that grade level, whether or not data exist for other grade levels. The sample for the cumulative measures of tables in this chapter are those students for whom data were available for all four high school grade levels.

† The subset of students for whom we have measures of reading and mathematics grade levels and teacher ratings of in-class performance includes students who were 12th-graders in 1988-89, 1989-90, or 1990-91. For the first two of these three school years, the subsample includes only students who were classified as learning disabled, seriously emotionally disturbed, speech impaired, or mildly or moderately mentally retarded. All NLTS 12th-graders in 1990-91 were included in the subsample for that school year.

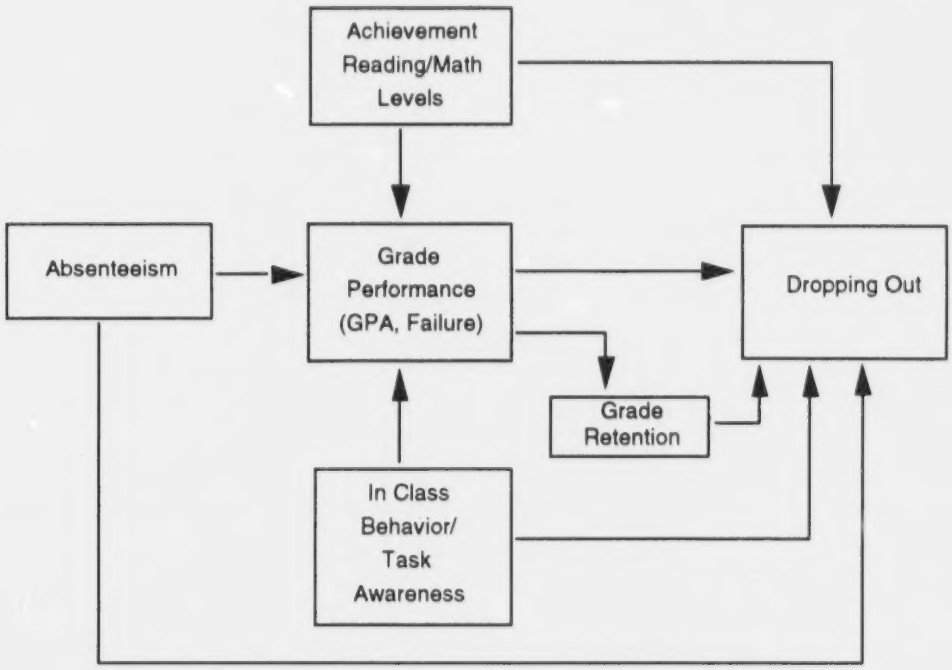

FIGURE 3-1 RELATED INDICATORS OF STUDENT PERFORMANCE

Absenteeism

The problem of student absenteeism is well documented in the general population. Despite the inevitability that students will miss some school involuntarily because of illness, there is evidence that high levels of absenteeism are associated with a host of negative outcomes, including lower grades and an increased probability of failure to complete a secondary education (Thornton and Zigmond, 1987; Wagner, 1991a). These factors, in turn, have documented negative effects on a number of postschool adjustment measures (Rumberger, 1987; Wagner, Blackorby, Cameto, and Newman, 1993). Extreme levels of voluntary absenteeism can symbolize students' disconnectedness from school and the educational process as a whole. Regardless of whether voluntary or involuntary, substantial absenteeism makes it difficult to complete class requirements and receive passing grades and ultimately deprives students of some of their educational experience (Wehlage et al., 1989).

To what degree were students with disabilities absent from secondary school? On average, students who remained in high school for four grade levels missed 3 weeks of school per year. Students missed 15 days each in 9th and 10th grades, 16 days in 11th grade, and

14.5 days in 12th grade. Similarly, students who were not assigned to grade levels were absent an average of 16 days annually. However, these averages mask widely varying levels of absenteeism. Figure 3-2 shows that approximately one-half of students with disabilities missed 10 or fewer days of school per year, and about another one-fourth missed between 2 and 3 weeks. Between 21% and 25% of students missed 4 school weeks or more of the typical 39 weeks of school. Thus, substantial numbers of students with disabilities missed a sizable portion of their educational time each year of high school. These findings are consistent with previous NLTS results (Wagner, 1991a). Further, the level of absenteeism among students with disabilities is somewhat larger than that in the general population (e.g., Jones et al., 1983, found that 17% of students in the general population missed more than 20 days of school per year).

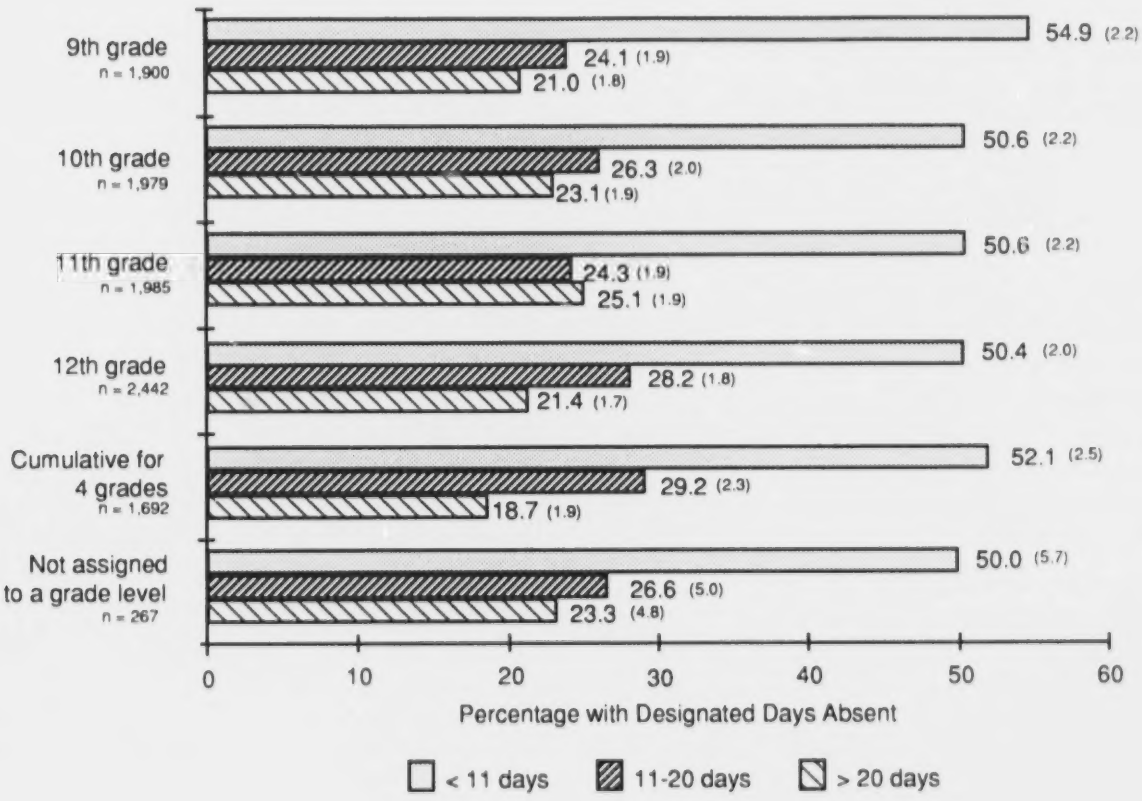

FIGURE 3-2 AVERAGE DAYS ABSENT PER YEAR, BY GRADE LEVEL

Despite the relative consistency of absenteeism across grade levels, average absenteeism differed significantly for students in different disability categories (Table 3-1). Specifically, students with serious emotional disturbances, learning disabilities, or health impairments missed more school than their peers in most other disability categories. On the other hand, students with sensory or speech impairments typically missed less school than students in other categories. For example, in 9th grade, students with serious emotional disturbances averaged 18 days absent from school, significantly more than students who were hard of hearing (11 days; $p<.05$). Students with other health impairments also missed a considerable amount of school (16 days on average), probably because of illness or medical treatments. In contrast, students with serious emotional disturbances were more likely than other students to evidence a variety of indicators of disconnectedness from school (i.e., low rates of school group membership, high rates of affiliation with friends outside of school; Newman, 1991), suggesting that their absenteeism was more likely to be voluntary, another indicator of disassociation from school.

Table 3-1

AVERAGE DAYS ABSENT FROM SCHOOL, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
Average days absent for students in:											
9th grade	14.8	14.2	17.9	11.0	16.3	11.8	10.8	9.5	13.5	16.3	14.6
	(0.9)	(1.2)	(2.2)	(1.2)	(1.5)	(1.5)	(1.1)	(1.2)	(1.7)	(2.5)	(2.9)
n	1,900	383	186	172	300	179	231	116	177	98	55
10th grade	15.0	14.5	18.1	12.6	15.3	13.0	10.6	10.1	16.6	21.5	14.6
	(0.7)	(1.0)	(1.9)	(1.6)	(1.4)	(1.5)	(0.9)	(1.2)	(1.9)	(3.3)	(3.2)
n	1,979	391	197	171	295	189	258	122	179	113	59
11th grade	16.4	16.6	19.7	12.5	15.9	11.9	12.4	12.8	13.2	18.0	14.0
	(0.9)	(1.2)	(2.1)	(2.0)	(1.5)	(1.4)	(1.2)	(1.8)	(1.4)	(2.1)	(2.5)
n	1,985	416	166	174	290	180	259	123	191	124	57
12th grade	14.5	14.7	17.9	11.4	13.3	12.8	11.4	11.5	13.1	17.7	10.9
	(.6)	(.9)	(1.6)	(1.1)	(1.1)	(1.3)	(0.9)	(1.20	(1.2)	(2.1)	(1.7)
n	2,442	522	208	232	348	222	319	162	233	132	58
Cumulative†	13.1	13.4	15.3	10.5	11.7	11.2	10.6	10.7	12.7	15.3	11.5
	(.6)	(.8)	(1.5)	(1.2)	(1.0)	(1.1)	(.8)	(1.1)	(1.0)	(1.6)	(1.8)
n	1692	336	132	162	217	162	248	119	167	98	47
Not assigned to grade level	15.5	--	--	--	--	--	--	--	--	--	--
	(1.7)										
n	267										

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

† The cumulative average is not equivalent to the average of each grade level because it is based on a different sample, i.e., students with data for four grade levels.

In considering the relationship of demographic characteristics to absenteeism, we find no significant gender differences at any grade level. However, ethnic group membership appears to be strongly related to absenteeism (Table 3-2). For example, African American and Hispanic students were absent more often than their white peers in 9th grade (19 days vs. 12 days; $p<.05$). The difference in absenteeism between African American and white students is consistent across the 4 years of secondary school. However, the Hispanic students who stayed in school missed fewer days later in high school (e.g., 14 days in 12th grade vs. 19 days in 9th grade) and were more similar to white students than to African American peers in 11th and 12th grades. These findings largely resemble findings in the general population, in which African American students missed more school than their white counterparts (NCES, 1984).

Household income had a strong linear relationship to the level of absenteeism in that students who came from wealthier households tended to miss fewer days of school than their peers from less wealthy families. For example, students from households earning $25,000 or more annually missed 11 days of school in 9th grade, significantly fewer than the 19 days missed by their peers from families earning less than $12,000 annually ($p<.05$). This, too, is consistent with other research that suggests that absenteeism is more prevalent among students from economically disadvantaged backgrounds (Bachman, 1970; Scott-Jones, 1984; Wilson, 1987).

Table 3-2

AVERAGE DAYS ABSENT FROM SCHOOL, BY SELECTED STUDENT CHARACTERISTICS

		Ethnic Background			Household Income		
		White	African American	Hispanic	<$12,000	$12,000 to 24,999	≥$25,000
Average days absent for students in:							
9th grade		12.3	18.6	18.8	18.8	14.9	10.9
		(1.0)	(2.2)	(4.2)	(2.4)	(1.6)	(1.2)
	n	1,098	371	131	361	404	712
10th grade		13.3	18.6	15.8	20.0	15.9	11.2
		(.9)	(1.8)	(4.4)	(2.0)	(1.6)	(1.0)
	n	1,149	378	149	364	431	756
11th grade		15.1	18.8	14.7	20.2	16.8	12.9
		(1.0)	(2.2)	(3.8)	(2.2)	(1.8)	(1.2)
	n	1,202	333	148	354	447	780
12th grade		13.2	19.1	13.9	16.9	14.5	11.7
		(.7)	(2.0)	(3.1)	(1.8)	(1.3)	(0.7)
	n	1,492	394	166	416	526	970
Cumulative		12.2	16.5	11.2	16.8	13.5	10.4
		(.7)	(1.8)	(2.2)	(1.6)	(1.2)	(.7)
	n	1,070	280	124	290	379	703
Not assigned to grade level		14.5	13.8	--	15.6	16.6	13.4
		(2.0)	(3.0)		(3.5)	(4.4)	(2.5)
	n	147	59		64	67	69

Standard errors are in parentheses.

* Percentages are reported separately only for categories with at least 25 students.

Reading and Mathematics Abilities

In addition to absenteeism, the NLTS conceptual framework suggests that students' abilities influence the grades they earn and other measures of school performance. Standardized achievement tests are a common method of assessing student ability, despite ongoing controversy regarding their appropriateness and validity for students who have special needs, including those with disabilities and those of limited English proficiency. Regardless of one's view of standardized tests, they do provide a general standard of performance in basic content areas, such as reading and mathematics, at particular grade levels. Although the NLTS did not collect standardized test scores for all NLTS participants, for a subset of youth, teachers were asked to identify the grade level at which students performed in reading and mathematics, according to their most recent assessments, and the year in which the assessments were done. These data allow us to estimate the difference between the grade level to which students were assigned when assessed and the grade levels at which they performed in reading and mathematics. So, for example, 10th-grade students who were reading at an 8th grade level were scored a -2 on the grade differential measure, those reading at their current grade level when they were assessed were scored a "0" differential, and those reading above grade level at the time they were assessed were given a positive differential score.

Readers should be aware that the samples for these analyses are smaller than those for NLTS analyses as a whole because data were gathered only for a subset of youth. Hence, even sizable differences between groups may not attain statistical significance. These sizable differences are noted, even when they do not attain statistical significance at conventional levels, but the differences should be considered only suggestive and not definitive relationships for students with disabilities.

Table 3-3 suggests that students with disabilities read and computed below the typical levels for their grades. In reading, students with disabilities averaged 3.5 years behind grade level, with their average degree of deficit ranging from -2 years to -5.6 years. In mathematics, the average was similar; students overall were 3.2 years behind grade level, with a range of averages from -1.5 years to -5.7 years. It is interesting to note the large distribution in reading and math levels. Similar proportions of youth with disabilities were 1 year or less behind grade level and more than 5 years behind grade level. For example, 30% of youth with disabilities were 1 year or less behind in reading, whereas 29% were more than 5 years behind. In math, 33% were a year or less behind, in comparison with 25% who were more than 5 years behind.

In both subject areas, students with mental retardation were the farthest from their assigned grade level and their peers with speech impairments were the closest ($p<.05$ comparing the two categories of students). Previous NLTS work has shown that many students with speech impairments were declassified from special education and completed their secondary educations entirely in regular education classes; despite the declassification of some students in this category, the overall tendency was for them to remain behind their grade peers. In general, students with disabilities were farther from grade level than peers in the

general population, among whom only 18% and 14% functioned below grade level in reading and mathematics, respectively (NCES, 1992).

Regarding the performance of students with serious emotional disturbances, Table 3-3 suggests that these students were closer to their assigned grade level than peers in other disability categories except speech impaired (-2.2 years in reading and -1.8 years in mathematics). Yet virtually every other performance measure considered in this chapter shows these students to be the lowest performers compared with peers with other disabilities. To the extent that standardized test scores reflect ability to perform well in coursework, students with serious emotional disturbances seem to be comparatively capable of doing their coursework. Hence, their poor performance on indicators such as grades may stem from reasons other than low ability (e.g., absences or behavior).

Table 3-3

GRADE LEVEL DIFFERENTIALS IN READING AND MATHEMATICS

	Average Grade Level Differential		
	Reading	Mathematics	n
All conditions*	-3.5	-3.2	579/569
	(.2)	(.2)	
Primary disability category			
Learning disabled	-3.1	-2.7	160/164
	(.3)	(.3)	
Emotionally disturbed	-2.2	-1.8	68/66
	(.6)	(.6)	
Speech impaired	-2.0	-1.5	82/81
	(.7)	(.8)	
Mentally retarded	-5.6	-5.7	116/115
	(.3)	(.3)	
Orthopedically/other health impaired	-4.5	-3.3	63/64
	(.7)	(.7)	
Hearing impaired	-3.6	-4.2	58/55
	(.8)	(.7)	
Gender			
Male	-3.3	-3.0	359/354
	(.3)	(.3)	
Female	-4.0	-3.7	220/215
	(.4)	(.4)	
Ethnic background			
White	-3.2	-2.8	400/391
	(.3)	(.3)	
African American	-3.8	-3.8	90/90
	(.6)	(.6)	
Hispanic	-4.9	-5.0	42/41
	(.8)	(.8)	

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

Students' reading and mathematics levels also differed with respect to their demographic characteristics. Although the difference is not statistically significant, female students were .7 years farther behind grade level than their male peers in both reading and math. This may reflect some tendency for female students to have to exhibit more severe deficits in order to be referred for special services (Wagner, 1992). White students were closer to their assigned grade level in both reading and mathematics when compared with their African American and Hispanic peers (e.g., -3.2 vs. -4.9 for reading, $p<.01$). On the other hand, household income seemed to play only a minor role in reading and math levels. Only .4 years separated students from the highest and lowest income categories. It is possible that differences in performance on some measures for students in different household income categories were due to factors other than ability.

Teacher Ratings of Student Behavior

Each of the performance measures investigated by the NLTS serves as an indicator of one aspect of students' performance in the school environment. Grade point average and course failure relate to the successful completion of course content, while absenteeism may suggest a student's overall connectedness to the school. But few indicators illuminate the ways that students behave in their classes—e.g., whether they do their homework or get along with others—factors that arguably are important for success in school as well as adult life.

To fill in this missing piece in the puzzle of student performance, the NLTS asked teachers to respond to a series of questions regarding the behavior of 12th-grade students in class. Responses to these questions have been used to construct two scales: a behavioral norm scale and a task performance scale.

Behavioral Norm Scale

Teachers were asked to rate how well 12th-grade students (1) got along with others in the class, (2) followed directions, and (3) controlled their behavior in class. Teachers rated each aspect of behavior on a 4-point scale ranging from "very well" (4 points) to "not at all well" (1 point). Scores for individual items were combined into a 6-category scale on which a score of 1 means that all three behaviors were done "not at all well" or "fairly well" and a 6 indicates that all three behaviors were done "very well." Further, teachers were asked to rate each aspect of a student's behavior in each of four different settings in which the student may have been placed: regular education academic classes, special education academic classes, regular education vocational classes, and work experience programs.* Figure 3-3 indicates, for each setting, students' scores on this behavioral norm scale grouped into three categories: low (a score of 1 or 2), medium (a score of 3 or 4), and high (a score of 5 or 6).

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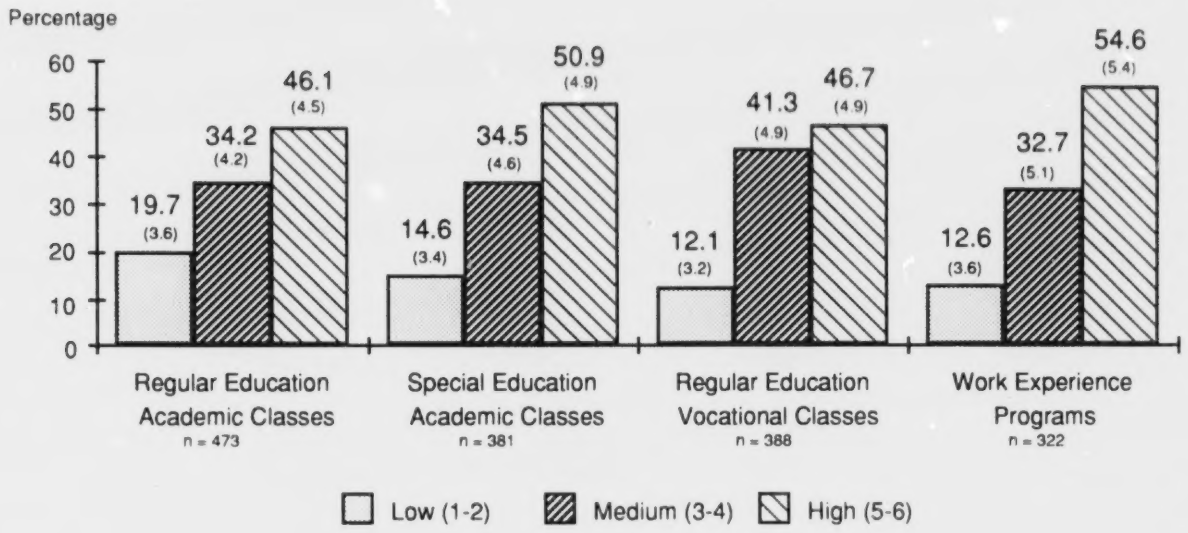
* For a given setting, teachers rated only students who were placed in that setting. Thus, the ratings for each setting represent different samples of students.



Standard errors are in parentheses.

FIGURE 3-3 BEHAVIORAL NORM SCALE SCORES FOR 12TH-GRADERS WITH DISABILITIES

Approximately half of students with disabilities were rated highly by their teachers in their ablity to get along with others, follow directions, and control their behavior in class. This ranged from 46% of students rated highly in regular education academic classes to 55% in work experience programs. Another third of students with disabilities received medium ratings, and a minority of students were rated low in their in-class behavior. One in five students received low ratings for their behavior in regular education academic classes, compared with 12% to 15% of students in other settings.

When we look at behavior ratings for students that differ in their primary disability (Table 3-4), we see both some consistent patterns and some significant differences. For each disability category, a larger percentage of students scored in the high category than in other categories, regardless of instructional setting, indicating positive class-related behaviors. Despite these overall high ratings, significant differences between categories of youth are observed. Students with serious emotional disturbances or mental retardation were most likely to be rated low in both regular education classroom settings. On the other hand, hearing impaired students were the most likely to score highly on the scale in two of the three classroom settings, with 7 of 10 of them scoring high in special education academic classes

and regular education vocational classes. Also, there were few variations by instructional setting for students, regardless of disability. For example, the percentages of students with mental retardation who were rated highly on in-class behaviors differed by only 5 percentage points; high ratings of students with hearing impairments varied by 12 percentage points, ranging from 59% in work experience programs to 71% in special education academic classes.

Table 3-4

BEHAVIORAL NORM SCALE SCORES, BY DISABILITY CATEGORY*

Instructional Setting	Primary Disability Category: Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Hearing Impaired	Orthopedically/ Other Health Impaired
Percentage receiving rating in:						
Regular education academic classes						
Low	15.9 (4.4)	32.8 (9.5)	13.2 (6.1)	31.5 (8.0)	10.6 (7.2)	27.2 (12.2)
Medium	36.7 (5.8)	29.9 (9.3)	22.4 (7.6)	30.2 (7.9)	28.2 (10.5)	25.4 (11.9)
High	47.4 (6.1)	37.2 (9.8)	64.6 (8.7)	38.3 (8.4)	61.2 (11.4)	47.4 (13.6)
Special education academic classes						
Low	8.9 (4.2)	12.9 (8.3)	13.6 (10.6)	20.1 (5.5)	.8 (2.1)	8.8 (7.1)
Medium	41.3 (7.3)	55.3 (12.3)	46.2 (15.5)	38.5 (6.7)	28.1 (10.6)	47.1 (12.5)
High	49.9 (7.4)	31.8 (11.5)	40.2 (15.2)	41.5 (6.8)	71.0 (10.7)	44.1 (12.4)
Regular education vocational classes						
Low	10.9 (4.0)	20.3 (9.9)	9.5 (6.1)	27.7 (8.0)	9.4 (6.6)	17.6 (11.8)
Medium	33.8 (6.2)	47.0 (12.3)	32.0 (9.8)	34.9 (8.5)	20.3 (9.2)	32.9 (14.6)
High	55.3 (6.5)	32.6 (11.5)	58.5 (10.3)	37.3 (8.6)	70.3 (10.4)	59.5 (15.5)
Work experience programs						
Low	9.3 (4.7)	9.5 (8.5)	7.3 (6.8)	22.7 (6.8)	15.5 (9.4)	5.4 (6.6)
Medium	28.7 (7.3)	38.7 (14.1)	44.1 (13.0)	39.2 (7.9)	25.5 (11.4)	43.7 (14.5)
High	62.0 (7.8)	51.8 (14.5)	48.6 (13.1)	38.1 (7.9)	59.0 (12.8)	50.9 (14.6)
n	147	63	89	66	44	41

Standard errors are in parentheses.

* Levels of ratings were low (1-2), medium (3-4), and high (5-6).

The major exception to this point (although differences are not statistically significant with the small samples involved) is the rating of behaviors among students with serious emotional disturbances, for whom behavior ratings were higher in work experience programs than in other instructional arenas (52% scored high vs. 32% to 37% in other settings). Students with learning disabilities also scored highest in their work experience programs, relative to other settings. It is plausible that the hands-on nature of many work experience programs matches the style of students with serious emotional disturbances or learning disabilities more than a traditional classroom setting does.

Students of both genders were rated largely similarly in their behavior across the four settings. However, Table 3-5 shows that students who were members of different ethnic groups were rated differently with respect to their in-class behaviors. Approximately half of

Table 3-5

BEHAVIORAL NORM SCALE SCORES, BY SELECTED STUDENT CHARACTERISTICS*

	Ethnic Background			Household Income		
Instructional Setting	White	African American	Hispanic	<$12,000	$12,000-$24,999	≥$25,000
Percentage of students receiving rating in:						
Regular education academic classes						
Low	17.7	33.2	1.3	24.0	15.5	21.8
	(3.9)	(12.0)	(4.3)	(8.9)	(6.3)	(5.6)
Medium	34.0	24.3	55.3	21.4	47.0	27.3
	(4.8)	(10.9)	(19.1)	(8.6)	(8.7)	(6.1)
High	48.3	42.5	43.4	54.6	37.5	50.9
	(5.1)	(12.6)	(19.1)	(10.4)	(8.4)	(6.8)
Special education academic classes						
Low	9.0	21.3	8.5	15.8	6.5	12.4
	(3.3)	(10.3)	(10.0)	(7.6)	(4.8)	(5.2)
Medium	39.8	38.3	44.5	38.7	40.3	43.3
	(5.7)	(12.2)	(17.9)	(10.1)	(9.6)	(7.8)
High	51.2	40.4	47.9	45.5	53.2	44.3
	(5.8)	(12.4)	(17.9)	(10.3)	(9.8)	(7.9)
Regular education vocational classes						
Low	12.8	17.6	3.0	18.4	10.8	17.7
	(3.7)	(10.5)	(8.4)	(8.1)	(6.0)	(5.9)
Medium	36.8	22.3	48.9	28.7	44.3	25.8
	(5.3)	(11.4)	(24.8)	(9.4)	(9.6)	(6.8)
High	50.4	60.1	48.1	52.9	44.9	56.5
	(5.5)	(13.5)	(24.8)	(10.4)	(9.6)	(7.7)
Work experience programs						
Low	12.9	8.7	7.8	12.8	11.9	13.5
	(4.1)	(8.7)	(12.4)	(7.7)	(6.8)	(5.6)
Medium	33.3	26.3	63.9	26.3	47.0	26.8
	(5.8)	(13.5)	(22.2)	(10.2)	(10.5)	(7.3)
High	54.0	65.0	28.3	60.8	41.1	59.8
	(6.1)	(14.6)	(20.8)	(11.3)	(10.4)	(8.1)
n	334	68	33	85	124	205

Standard errors are in parentheses.
* Levels of ratings were low (1-2), medium (3-4), and high (5-6).

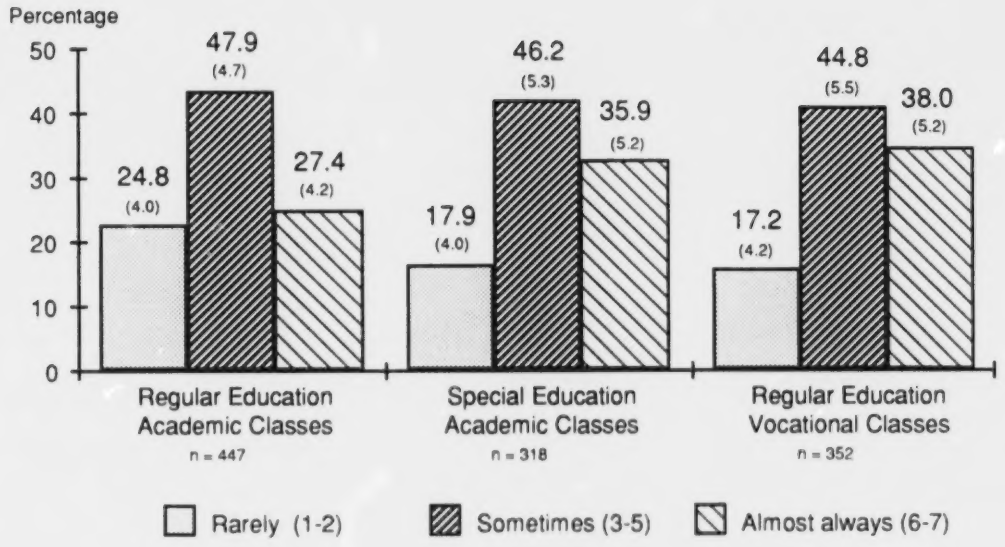
white students received high ratings from their teachers on their in-class behavior, regardless of setting. In comparison, African American students were the most likely to be rated low on their in-class behaviors compared with their white and Hispanic peers in academic classes in both regular education (33% vs. 18% and 1%) and special education settings (21% vs. 9%). However, in vocational settings, the in-class behaviors of marginally more African American students were rated highly (e.g., 65% vs. 54% and 28% for white and Hispanic students in work experience programs). It is not entirely clear whether some students behaved differently in different settings or whether different standards of behavior were applied. Whatever the cause, it appears that African American students with disabilities received better behavior ratings in vocational and work experience classes than in academics.

Socioeconomic status often is associated with school performance. However, there are no consistent or systematic relationships between behavior ratings and household income in various instructional settings. For example, students from households in the middle income range in Table 3-5 were less likely to be rated highly in their in-class behavior than both their less wealthy and more wealthy peers in regular academics, vocational classes, and work experience programs; yet they received ratings similar to other students in special education.

Task Performance Scale

A task performance scale quite similar to the behavioral norm scale was created. Using a 4-point scale ranging from rarely (1 point) through sometimes, almost always, and always (4 points), teachers were asked to rate students on how often they (1) completed homework on time, (2) took part in group discussions in class, and (3) stayed focused on class work. Responses regarding these three items were grouped logically into a 7-point scale and are presented here in three categories: rarely (1-2), sometimes (3-5), and almost always (6-7). Teachers were asked about students' behavior in three settings: regular education academic classes, regular education vocational classes, and special education classes.

Figure 3-4 depicts teachers' ratings of the frequency that students performed school-work related tasks in the three instructional settings. There appear to be differences with respect to the particular instructional settings. Whereas the most common rating in all three settings was "sometimes"—ranging from 45% to 48%—vocational and special education teachers were more likely to indicate that students with disabilities "almost always" performed in-class tasks than were regular education academic teachers (36% and 38% vs. 27%). Clearly, the class characteristics, curricula, and in-class tasks in the three instructional areas differed considerably. However, we cannot assess whether differences in ratings of students' task performance are a function of differences in the instructional settings or whether students responded differently to the requirements associated with the settings, or some combination thereof.



Standard errors are in parentheses.

FIGURE 3-4 TASK PERFORMANCE SCALE SCORES FOR 12TH-GRADERS WITH DISABILITIES

How were students in different disability categories rated in the frequency with which they attended to classroom tasks? Table 3-6 shows that the task-related behaviors of students with different disabilities were rated quite differently in different instructional domains; no one category of student was rated uniformly across instructional settings. For example, students with mental retardation were most likely "rarely" to attend to in-class tasks in regular education academic and vocational courses (35% and 29%), but were no more likely than other students to do so in special education classes (14%). In contrast, hearing impaired students were quite likely to attend to tasks "almost always" in academic classes in special and regular education settings (43% and 56%), but were not particularly likely to do so in vocational classes (27%). Further, students with speech impairments were most likely to attend to tasks "almost always" in regular education academic classes (48%) and vocational education (46%) and least likely to receive such ratings in special education (16%). Despite this complexity, students in almost all categories received more "rarely" ratings in regular education academics than in the other instructional settings.

Table 3-6

TASK PERFORMANCE RATINGS, BY DISABILITY CATEGORY*

Instructional Setting	Primary Disability Category: Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Hearing Impaired	Orthopedically/ Other Health Impaired
Percentage of students receiving rating in:						
Regular education academic classes						
Rarely	22.4 (5.2)	30.3 (9.5)	20.8 (7.4)	35.3 (8.8)	10.9 (7.7)	26.6 (12.2)
Sometimes	50.5 (6.3)	47.3 (10.3)	31.2 (8.5)	42.5 (9.1)	46.5 (12.3)	32.8 (13.0)
Almost always	27.1 (5.6)	22.4 (8.6)	48.0 (9.1)	22.2 (7.6)	42.6 (12.2)	40.6 (13.6)
Special education academic classes						
Rarely	19.4 (6.2)	12.4 (9.1)	10.5 (10.4)	14.4 (5.0)	12.9 (8.1)	17.1 (10.0)
Sometimes	39.4 (7.6)	46.0 (13.7)	73.3 (15.0)	55.6 (7.1)	31.6 (11.3)	49.2 (13.3)
Almost always	41.2 (7.7)	41.6 (13.6)	16.2 (12.5)	30.0 (6.5)	55.5 (12.2)	33.7 (12.5)
Regular education vocational classes						
Rarely	15.1 (5.1)	25.4 (12.8)	19.2 (9.2)	29.2 (9.2)	13.2 (8.3)	9.6 (9.1)
Sometimes	46.2 (7.0)	52.3 (14.7)	24.4 (11.1)	44.6 (10.1)	59.4 (12.0)	55.2 (15.3)
Almost always	38.6 (6.9)	22.3 (12.3)	46.5 (11.6)	26.3 (8.9)	27.4 (10.9)	35.2 (14.7)
n	147	63	89	66	44	41

Standard errors are in parentheses.

* Levels of ratings were rarely (1-2), sometimes (3-5), and almost always (6-7).

Variations in students' task performance ratings by their demographic characteristics are included in Table 3-7. Male students with disabilities were more likely than their female peers "rarely" to attend to in-class tasks in regular education academic classes (29% vs. 16%) and special education classes (21% vs. 10%), but not in vocational classes (17% vs. 20%). Female students were an exception to the rule that "rarely" ratings were given more often in regular education academic classes than in other settings. This gender difference in ratings of task performance contrasts with the similar ratings given male and female students on their in-class behaviors, suggesting that gender differences are more salient in teacher assessments of social behaviors than of task-oriented activities.

No ethnic group differences are apparent in the task performance of students in regular education academic classes. However, African American students were more likely to "rarely" attend to the tasks of schooling in special education classes. In contrast, they were the most

likely to attend to tasks "almost always" in the vocational classes. Household income also appears to be complicated and nonlinearly related to the task performance of students in different settings. For example, students in the wealthiest category were most likely to attend to school-related tasks "almost always" in academic classes, but were no more likely than others to be rated highly in vocational classes. These findings suggest that teacher ratings of students' behavior depends both on the disability of students and on the instructional setting in which teachers encounter those students.

Table 3-7

TASK PERFORMANCE RATINGS, BY SELECTED STUDENT CHARACTERISTICS*

	Gender		Ethnic Background			Household Income		
Instructional Setting	Male	Female	White	African American	Hispanic	<$12,000	$12,000 to $24,999	≥$25,000
Regular education academic classes								
Rarely	29.3	15.8	22.7	26.0	16.7	29.1	14.6	31.3
	(5.3)	(5.5)	(4.4)	(11.4)	(15.0)	(9.7)	(6.2)	(6.7)
Sometimes	44.5	54.5	48.8	44.9	62.0	52.3	56.9	37.3
	(5.8)	(7.6)	(5.3)	(13.0)	(19.5)	(10.7)	(8.7)	(7.0)
Almost always	26.1	29.7	28.6	29.2	21.3	18.6	28.5	31.4
	(5.1)	(6.9)	(4.8)	(11.9)	(16.4)	(8.3)	(7.9)	(6.7)
Special education academic classes								
Rarely	20.5	10.0	11.5	30.4	13.4	28.3	11.7	14.1
	(5.3)	(5.0)	(3.9)	(12.1)	(12.5)	(9.8)	(6.5)	(5.9)
Sometimes	42.8	49.2	45.1	44.4	42.8	40.1	45.8	41.5
	(6.5)	(8.3)	(6.1)	(13.1)	(18.1)	(10.7)	(10.1)	(8.3)
Almost always	36.7	40.8	43.5	25.2	43.8	31.6	42.6	44.3
	(6.3)	(8.2)	(6.1)	(11.4)	(18.2)	(10.2)	(10.0)	(8.4)
Regular education vocational classes								
Rarely	16.8	20.2	15.9	22.3	15.9	16.3	12.4	23.9
	(5.1)	(7.1)	(4.5)	(12.6)	(20.2)	(9.0)	(6.9)	(7.2)
Sometimes	47.5	43.4	49.3	27.8	73.4	42.7	52.1	40.4
	(6.8)	(8.8)	(6.1)	(13.6)	(24.4)	(12.0)	(10.4)	(8.3)
Almost always	35.7	36.4	34.8	49.9	10.7	41.0	35.5	35.7
	(6.5)	(8.5)	(5.8)	(15.2)	(17.1)	(11.9)	(10.0)	(8.1)
n	303	172	334	68	33	85	124	205

Standard errors are in parentheses.

* Levels of ratings were rarely (1-2), sometimes (3-5), and almost always (6-7).

Grade Performance

The NLTS has considered two aspects of students' grades: grade point averages (GPAs) and receipt of failing grades. Grades and grade point averages are familiar to participants in and observers of American education alike. They are ubiquitous at both high school and college levels and are used to make decisions that can be influential in the way that students' lives proceed. Opportunities for postsecondary education, in particular, often are linked to grades (Pallas, Natriello, and McDill, 1988). Grades, of course, have been criticized as being inadequate as measures relative to their importance in the decisionmaking process (Byrnes, 1989). In spite of this controversy, grade point averages have been used in a large number of studies as predictors of postsecondary success, employment, and wages (Donohoe and Zigmond, 1990).

In addition to successful completion of course objectives, many factors are known to affect grades and grading practices. There is evidence of differential grading practices in different instructional areas (e.g., academic vs. vocational), as well as considerable individual variation across teachers with respect to grading practices (Rowjewski, Pollard, and Meers, 1992). This complexity is further complicated by differences in the evaluation methods, norms, and expectations used traditionally in regular education settings in comparison with those used in special education. Further, as mentioned in Chapter 1, even when students with disabilities are placed in regular education classes, grades assigned to them in those classes may not have the same meaning as similar grades assigned to regular education students. The NLTS has found, for example, that 40% of secondary school students with disabilities attended schools that held them to different grading standards in regular education classes than were applied to other students in those classes (Wagner, 1991b). Despite these variations and complexities, GPAs can offer one perspective on students' performance in a widely used metric.

In calculating grade point averages, failing grades have a particularly harsh impact. When a secondary school student receives a failing grade, it is much more costly than simply the lowering of a grade point average; it also ensures that the student receives no credit for the course, which must be made up in some way, often through retaking the class. If this is a frequent occurrence in a student's educational experience, s/he begins to fall substantially behind age peers, a situation that is related to the noncompletion of secondary school (Wagner, 1991a; Thornton and Zigmond, 1987). There also may be psychological costs of repeated failure, in terms of youths' overall self-image and sense of competence with respect to school-related activities (Grissom and Shepard, 1989).

Variations in Grade Performance by Disability Category

Students with disabilities who completed 4 years of high school earned a cumulative grade point average of 2.3 (Table 3-8), below the national average of 2.6 earned by typical students in the 1980 sophomore class (NCES, 1984).

Students with disabilities demonstrated an increase in grade point average at successive grade levels. The GPA of students with disabilities in 9th and 10th grades was 2.0, compared with 2.1 in 11th grade and 2.3 in 12th grade ($p<.05$).

Table 3-8

GRADE PERFORMANCE, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
GPA for students in:											
9th grade	2.0	1.9	1.7	2.1	2.0	2.4	2.3	2.6	2.5	2.1	2.1
	(<.1)	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
10th grade	2.0	1.9	1.7	2.2	2.1	2.3	2.3	2.5	2.4	2.0	2.2
	(<.1)	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
11th grade	2.1	2.0	1.9	2.2	2.2	2.4	2.4	2.6	2.4	2.2	2.3
	(<.1)	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
12th grade	2.3	2.3	2.1	2.6	2.4	2.6	2.6	2.7	2.6	2.5	2.6
	(<.1)	(<.1)	(.1)	(.1)	(<.1)	(.1)	(<.1)	(.1)	(.1)	(.1)	(.1)
Cumulative	2.3	2.3	2.2	2.6	2.4	2.6	2.6	2.7	2.6	2.5	2.7
	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(<.1)	(.1)	(.1)	(.1)	(.1)
Percentage of students failing a course in:											
9th grade	42.7	44.6	56.5	39.7	33.5	29.6	31.1	21.8	27.0	40.9	30.3
	(1.8)	(2.7)	(3.7)	(3.7)	(3.0)	(3.6)	(3.1)	(4.0)	(3.3)	(4.5)	(6.5)
10th grade	43.9	44.8	56.7	38.2	37.3	30.9	34.9	27.0	32.8	55.9	34.8
	(1.9)	(2.8)	(3.8)	(3.9)	(3.1)	(3.7)	(3.2)	(4.4)	(3.6)	(4.7)	(6.7)
11th grade	37.5	38.7	54.1	34.3	28.5	30.6	30.4	22.9	29.4	43.3	16.7
	(1.9)	(2.7)	(4.2)	(3.8)	(3.0)	(3.8)	(3.1)	(4.1)	(3.5)	(4.7)	(5.3)
12th grade	23.1	24.1	30.4	19.0	18.3	24.6	16.9	14.7	15.3	28.8	14.9
	(1.5)	(2.2)	(3.6)	(2.9)	(2.4)	(3.3)	(2.4)	(3.1)	(2.6)	(4.3)	(5.1)
Cumulative	62.2	65.1	77.4	56.4	48.5	53.5	54.2	44.1	50.7	65.7	50.0
	(2.2)	(3.1)	(4.2)	(4.3)	(4.0)	(4.4)	(3.6)	(5.1)	(4.2)	(5.2)	(8.0)
Ns for:											
9th grade	2,979	548	299	282	418	265	387	180	306	200	90
10th grade	2,859	520	286	261	399	265	377	174	292	189	91
11th grade	2,771	532	235	258	375	250	371	180	293	185	87
12th grade	3,273	652	278	311	451	294	430	223	344	194	90
Cumulative	2,191	399	167	215	263	215	322	159	240	137	70

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

Table 3-8 also shows the percentages of students with disabilities who failed at least one class at each grade level and cumulatively over the 4 years they spent in secondary school. A majority of students with disabilities experienced some failure in high school; 62% failed at least one class at some point in their high school careers. These experiences of course failure tended to occur early in secondary school; 43% and 44% of 9th- and 10th-grade students with disabilities failed one or more classes at those grade levels. The percentages of students with disabilities who failed classes decreased somewhat during 11th grade (38%) and sharply in 12th grade (23%), consistent with the rising GPA in the upper grades.

At least three factors may help to explain the apparent improvement in grade performance over time. First, like other students who do not meet with academic success, students with disabilities who do not do well are more likely to leave school prematurely (Wagner, 1991a; Zigmond, 1987), leaving their academically more successful peers in the later grades (Peng and Takai, 1987). Second, it is plausible that 12th-graders were subject to more lenient grading standards because they were close to graduation. It is also possible that they may have completed more of their required courses and performed better in their electives.

Table 3-8 shows that improving grade performance for successive grade levels was consistent for students in all disability categories. Between 9th and 12th grades, GPA increases ranged from .1 grade point for deaf or orthopedically impaired students to .5 grade point for students with speech impairments or multiple handicaps. Similarly, the proportion of students failing one or more courses dropped almost 20 percentage points for students overall. Decreases in course failure rates between 9th and 12th grades ranged from 5 percentage points for students with visual impairments (whose rate of course failure was quite low at all grade levels) to 26 percentage points for students with serious emotional disturbances (whose rate was quite high).

We further see in Table 3-8 that students in different disability categories were awarded quite different grades. Cumulative GPAs ranged from 2.2 to 2.7. Deaf or orthopedically impaired students consistently earned the highest GPAs and had among the lowest course failure rates, whereas students with learning disabilities or serious emotional disturbances tended to earn lower GPAs and fail more often. The cumulative grade point average of deaf students (2.7) and students with orthopedic impairments (2.6), for example, were significantly greater than those of their peers with serious emotional disturbances and learning disabilities (2.3 and 2.2; $p<.05$). These findings resemble those reported by Donohoe and Zigmond (1990). However, it is interesting that these GPAs are inversely related to reading and mathematics abilities; Table 3-3 showed that hearing impaired 12th-graders were quite far behind grade level in their reading and mathematics abilities, yet they had relatively high GPAs, whereas students with serious emotional disturbances had reading and computation abilities much closer to their own grade level, yet had the lowest course grades. Despite relatively low GPAs for students in some categories, we note that the GPAs for students in six disability categories were equal to or exceeded the 2.6 earned by typical students.

Variations in Grade Performance by Demographic Characteristics

Education research is replete with examples of the relationship between demographic characteristics and various measures of performance, including grade point average (Alexander, Cook, and McDill, 1978; Rumberger, 1983). Table 3-9 depicts the grade performance of students with disabilities by gender, ethnic group membership, and household income. Female students with disabilities consistently earned higher GPAs and were less likely to fail courses than their male peers. The GPA differences were typically small (.1 or .2 grade point), as were differences in failure rates (from 4 percentage points in 12th grade to 12 percentage points in 11th grade, $p<.01$), but were prevalent across all four grade levels. Higher GPAs for females occurred despite their having reading and mathematics abilities that

Table 3-9

GRADE PERFORMANCE, BY SELECTED STUDENT CHARACTERISTICS

	Gender		Ethnic Background			Household Income		
	Male	Female	White	African American	Hispanic	<$12,000	$12,000 to $24,999	≥$25,000
GPA for students in:								
9th grade	1.9 (<.1)	2.1 (.1)	2.1 (<.1)	1.7 (.1)	1.8 (.1)	1.8 (.1)	1.9 (.1)	2.1 (<.1)
10th grade	1.9 (<.1)	2.1 (.1)	2.1 (<.1)	1.7 (.1)	2.0 (.1)	1.9 (.1)	1.9 (.1)	2.1 (<.1)
11th grade	2.0 (<.1)	2.2 (.1)	2.1 (<.1)	1.8 (.1)	2.2 (.1)	2.0 (.1)	2.1 (.1)	2.1 (.1)
12th grade	2.3 (<.1)	2.5 (<.1)	2.4 (<.1)	2.1 (.1)	2.5 (.1)	2.3 (.1)	2.3 (.1)	2.4 (<.1)
Cumulative	2.3 (<.1)	2.4 (.1)	2.4 (<.1)	2.0 (.1)	2.5 (.1)	2.2 (.1)	2.3 (.1)	2.4 (.1)
Percentage of students failing a course in:								
9th grade	45.0 (2.2)	37.6 (3.1)	35.6 (2.3)	56.4 (4.3)	56.6 (7.2)	46.9 (4.2)	46.7 (3.9)	35.9 (3.0)
10th grade	45.6 (2.3)	40.1 (3.2)	37.3 (2.4)	56.9 (4.4)	52.0 (7.5)	47.8 (4.3)	46.5 (4.0)	36.6 (3.1)
11th grade	41.3 (2.3)	29.1 (3.1)	32.9 (2.3)	54.3 (4.8)	30.9 (7.3)	43.7 (4.4)	37.8 (3.9)	33.5 (3.0)
12th grade	24.3 (1.8)	20.3 (2.6)	21.1 (1.8)	33.7 (4.3)	20.3 (6.2)	26.7 (3.8)	23.7 (3.3)	21.7 (2.4)
Cumulative	64.2 (2.6)	58.1 (3.9)	57.6 (2.7)	75.6 (4.7)	68.2 (8.5)	70.1 (4.8)	68.2 (4.3)	56.7 (3.5)
Ns for:								
9th grade	1,821	1,155	1,686	520	305	563	654	1,105
10th grade	1,756	1,101	1,625	501	291	531	629	1,077
11th grade	1,686	1,081	1,631	448	276	512	618	1,083
12th grade	1,977	1,292	1,960	514	290	568	702	1,314
Cumulative	1,319	872	1,337	347	215	390	487	903

Standard errors are in parentheses.

were farther behind grade level than their male counterparts. Perhaps female students were more successful in making positive impressions on dimensions to which grades often relate, such as behavior.

Ethnic group membership is related to academic performance in the general population (Alexander, Cook, and McDill, 1978; Rumberger, 1983), as well as among students with disabilities. Cumulatively, white students with disabilities earned higher GPAs and were less likely to fail courses than their African American peers (2.4 vs. 2.0 for GPAs; 58% vs. 76% failure rates; $p<.001$). The differences were particularly noticeable at the lower grade levels. The performance of Hispanic students with disabilities vis-à-vis students from other ethnic groups was not so consistent. In 9th grade, for example, Hispanic students earned lower GPAs than white peers (1.8 vs. 2.1, $p<.01$). In subsequent years, however, Hispanic students appeared to catch up to white students, so that by 12th grade their average GPA exceeded that of white peers. A similar pattern exists for course failure rates, despite having reading and mathematics abilities that were farther behind grade level. The observed changes over time may be related to a differential dropout rate across ethnic groups. It may be, for example, that Hispanic students who failed early in high school dropped out then and those who remained were more capable. There is, too, a controversy of differential grading practices for students from different ethnic backgrounds. NLTS data, however, can neither confirm nor disconfirm those hypotheses.

Table 3-9 further suggests that there is a modest but unwavering pattern for wealthier students to earn higher GPAs and to have lower course failure rates than peers in the middle or lower income categories, despite there being no difference in their reading and mathematics abilities. The GPA differences, however, are small throughout and statistically significant only in the 9th grade. Differences in course failure rates are more substantial. Cumulatively, 57% of students from families earning $25,000 or more per year failed one or more classes, compared with 68% and 70% of students in lower income categories ($p<.05$). Although this pattern applies in all four years of secondary school, the relationships are most persuasive in the first two years of high school. As was the case in other spheres of performance, it is possible that these differences represent performance differences, behaviors, or standards, or simply that those students who failed classes early on dropped out of school, leaving the more successful students in the later grades.

Variations in Grade Performance by Instructional Setting

Previous research has demonstrated differential grade performance for students with disabilities in regular and special education classes, suggesting that different grading practices pertain in the two settings or that special education students simply perform better in special education settings (Wagner, 1991a; Thornton and Zigmond, 1990). The variations in grade performance by instructional setting are confirmed in Table 3-10, which shows that students averaged a higher cumulative GPA in special education than in regular education classes, although the difference is small (2.5 vs. 2.3 cumulatively). Differences were stable across grade levels.

Table 3-10

GRADE PERFORMANCE IN REGULAR AND SPECIAL EDUCATION CLASSES, BY DISABILITY CATEGORY

	All* Conditions	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
GPA for students in:											
9th grade											
Regular education	1.9	1.9	1.7	2.1	1.9	2.4	2.2	2.5	2.3	2.0	2.0
	(<.1)	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.2)
Special education	2.2	2.2	1.9	2.4	2.2	2.9	2.5	2.7	2.7	2.5	2.2
	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
10th grade											
Regular education	1.9	1.9	1.6	2.1	1.9	2.3	2.2	2.4	2.3	1.9	2.1
	(<.1)	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.2)
Special education	2.2	2.3	1.8	2.3	2.3	2.9	2.7	2.7	2.7	2.4	2.3
	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
11th grade											
Regular education	2.0	1.9	1.8	2.2	2.0	2.3	2.3	2.5	2.4	2.1	2.1
	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.2)
Special education	2.3	2.3	2.0	2.4	2.4	2.9	2.7	2.6	2.7	2.5	2.3
	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
12th grade											
Regular education	2.3	2.2	2.1	2.6	2.3	2.5	2.5	2.7	2.5	2.4	2.5
	(<.1)	(<.1)	(.1)	(.1)	(.1)	(.1)	(<.1)	(.1)	(.1)	(.1)	(.1)
Special education	2.5	2.5	2.3	2.7	2.6	3.0	2.8	2.9	2.9	2.7	2.6
	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
Cumulative											
Regular education	2.3	2.2	2.1	2.6	2.3	2.6	2.5	2.6	2.5	2.4	2.6
	(<.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.2)
Special education	2.5	2.5	2.2	2.6	2.6	3.0	2.9	2.9	2.9	2.7	2.7
	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)	(.1)
Percentage of students failing a course in:											
9th grade											
Regular education	38.2	39.5	52.0	38.9	29.8	27.7	29.1	18.2	24.6	38.9	16.8
	(1.8)	(2.7)	(3.8)	(3.7)	(2.9)	(3.6)	(3.0)	(3.8)	(3.3)	(4.5)	(5.3)
Special education	11.2	10.8	16.9	5.1	12.0	3.5	5.9	7.7	5.9	4.8	20.6
	(1.2)	(1.7)	(2.8)	(1.7)	(2.1)	(1.5)	(1.6)	(2.6)	(1.8)	(2.0)	(5.8)
10th grade											
Regular education	40.1	41.6	51.4	36.2	32.0	29.6	32.4	22.5	29.4	53.2	20.5
	(1.9)	(2.8)	(3.9)	(3.8)	(3.0)	(3.6)	(3.2)	(4.1)	(3.5)	(4.7)	(5.7)
Special education	11.5	10.0	20.1	6.2	13.8	4.0	5.7	7.6	5.9	11.2	21.2
	(1.2)	(1.7)	(3.1)	(1.9)	(2.3)	(1.6)	(1.6)	(2.6)	(1.8)	(3.0)	(5.7)
11th grade											
Regular education	34.4	35.8	51.2	33.7	23.5	28.2	28.0	18.9	27.1	42.9	11.7
	(1.8)	(2.7)	(4.3)	(3.8)	(2.9)	(3.7)	(3.1)	(3.8)	(3.4)	(4.7)	(4.6)
Special education	10.1	10.0	14.1	2.7	11.6	3.6	5.0	9.6	4.5	3.9	10.6
	(1.2)	(1.7)	(3.0)	(1.3)	(2.2)	(1.5)	(1.5)	(2.9)	(1.6)	(1.9)	(4.4)

Table 3-10 (Concluded)

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
Percentage of students failing a course in:											
12th grade											
Regular education	20.1	21.0	26.9	18.5	14.8	22.7	16.3	13.1	13.1	25.7	13.0
	(1.4)	(2.1)	(3.5)	(2.9)	(2.2)	(3.2)	(2.4)	(3.0)	(2.4)	(4.1)	(4.8)
Special education	4.6	4.7	5.7	1.8	5.3	2.6	1.8	3.3	2.5	3.1	2.0
	(.8)	(1.1)	(1.8)	(1.0)	(1.4)	(1.2)	(.8)	(1.6)	(1.1)	(1.6)	(2.0)
Cumulative											
Regular education	58.1	61.1	74.0	55.0	43.0	49.9	50.8	36.6	45.3	65.0	32.0
	(2.2)	(3.1)	(4.4)	(4.4)	(4.0)	(4.4)	(3.6)	(5.0)	(4.2)	(5.3)	(7.5)
Special education	15.3	14.2	22.7	8.5	19.0	8.6	9.4	19.7	9.7	10.0	34.2
	(1.6)	(2.3)	(4.2)	(2.4)	(3.1)	(2.5)	(2.1)	(4.1)	(2.5)	(3.3)	(7.6)
Ns for:											
9th grade											
Regular education	2,661	515	262	272	337	252	366	161	252	185	55
Special education	1,722	339	167	93	325	112	195	126	186	99	79
10th grade											
Regular education	2,548	494	242	248	316	251	354	134	249	180	56
Special education	1,705	324	171	84	336	102	217	134	160	93	81
11th grade											
Regular education	2,451	494	206	242	295	240	344	159	247	170	50
Special education	1,622	333	129	86	314	100	207	135	158	80	77
12th grade											
Regular education	2,800	583	235	282	335	277	391	196	274	167	53
Special education	1,859	380	135	104	378	119	233	167	187	81	72
Cumulative 9-12											
Regular education	2,173	393	163	215	260	215	319	158	239	137	70
Special education	2,173	393	163	215	260	215	319	158	239	137	70

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

A much larger difference is evident in the course failure rate. More than half of students with disabilities who took regular education classes failed one or more of them over four grade levels (58%), compared with only 15% of students who took special education classes failing any of those ($p<.001$). Differences in failure rates between regular education and special education classes ranged from 29 percentage points in 10th grade to 16 percentage points in 12th grade. It is essential to note that students with disabilities in general took many more classes in regular education (Hebbeler, 1993) and therefore had many more opportunities to succeed or to fail classes there. It is somewhat surprising, however, that students also failed special education classes (15% cumulatively), even though the expectations in special education are intended to reflect an individualized educational program.

Students in virtually all disability categories received marginally higher GPAs in special education than in regular education classes, with the exception of students classified as

speech impaired, whose GPA was 2.6 in both settings. Differences in GPAs ranged from .1 to .4 grade points across disability categories. Course failure rates were lower in special education classes for all categories of students except those with multiple handicaps, for whom failure rates were quite similar in the two settings because of lower course failure rates in regular education classes. The greatest difference in failure rates in the two settings is evident for students with serious emotional disturbances. These students had markedly higher failure rates than other students in regular education classes in 9th through 11th grades (e.g., 52% vs. 38% in 9th grade; $p<.001$) and failure rates that were quite similar to those of other students in special education (between 6% and 20% across grade levels), creating a wider gap than for students in any other category.

Time to Complete Grade Levels

The typical high school program is commonly understood to consist of two semesters per grade level and four grade levels; this program culminates in graduation and the acquisition of a diploma. However, we have seen that many students with disabilities experienced some course failure during high school. Course failure means the failure to accumulate Carnegie units toward graduation; failing enough courses in a year can result in the failure to be promoted to the next grade level that is appropriate to a student's chronological age. In this section, we examine the degree to which students with disabilities deviated from the typical pattern of progressing through grade levels in 2 semesters.

Most students with disabilities (85% to 89%) required just 2 semesters to complete a given grade level. A comparatively small number of students (2% to 6%) across grade levels attended summer school, either to earn enough credits to complete the grade-assigned curriculum or to supplement their program with extra instruction (Table 3-11). A similar number (3% to 6%) needed 3 or more semesters to be advanced to the next grade level. Interestingly, a similarly small percentage of students with disabilities required less than 2 semesters to complete a grade level. Thus, it appears that most students with disabilities experienced high school in the traditional sequence.

This progression through the grade levels applies to students in most disability categories, with some interesting variations. For example, students with sensory, orthopedic, or other health impairments were consistently the most likely students to supplement the traditional two semesters with summer school. There was less consistency in which students were most likely to require 3 or more semesters to complete a grade level, although students with serious emotional disturbances generally were among the most likely to need extra semesters, consistent with their high rate of course failure.

Table 3-11

SEMESTERS TO COMPLETE GRADE LEVELS, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
Percentage completing grade level in semesters indicated in:											
9th grade											
2 Sem + Summer	5.9	6.1	9.0	8.1	1.9	13.5	11.1	16.6	12.2	10.9	.5
	(.9)	(1.3)	(2.1)	(2.1)	(.9)	(2.7)	(2.1)	(3.6)	(2.4)	(2.8)	(1.0)
3+ Semesters	5.0	4.1	8.6	10.7	4.8	6.1	3.5	2.4	6.0	4.9	3.5
	(.8)	(1.1)	(2.1)	(2.4)	(1.4)	(1.9)	(1.2)	(1.5)	(1.8)	(2.0)	(2.6)
n	2,977	548	298	282	397	265	387	180	306	200	90
10th grade											
2 Sem + Summer	5.5	5.4	5.1	8.8	3.3	12.8	11.3	16.3	12.1	20.3	3.0
	(.9)	(1.3)	(1.7)	(2.3)	(1.2)	(2.7)	(2.1)	(3.6)	(2.5)	(3.8)	(2.4)
3+ Semesters	5.5	5.6	7.2	6.3	4.0	5.4	2.1	3.6	6.2	9.3	5.7
	(.9)	(1.3)	(2.0)	(1.9)	(1.3)	(1.8)	(1.4)	(.9)	(1.8)	(2.7)	(3.3)
n	2,859	520	286	261	399	265	377	174	292	189	91
11th grade											
2 Sem + Summer	6.3	6.5	7.9	11.8	1.8	15.2	12.0	13.0	12.7	17.8	3.9
	(.9)	(1.4)	(2.3)	(2.6)	(.9)	(3.0)	(2.2)	(3.3)	(2.5)	(3.7)	(2.8)
3+ Semesters	3.2	1.7	5.2	3.2	6.9	4.8	2.9	1.9	4.7	6.5	8.1
	(.7)	(.7)	(1.9)	(1.4)	(1.7)	(1.8)	(1.1)	(1.3)	(1.6)	(2.3)	(3.9)
n	2,768	532	235	257	374	250	371	180	292	185	87
12th grade											
2 Sem + Summer	2.1	1.9	3.9	4.1	.9	5.2	3.4	3.0	2.2	4.6	1.5
	(.5)	(.7)	(1.5)	(1.5)	(.6)	(1.7)	(1.2)	(1.5)	(1.0)	(2.0)	(1.7)
3+ Semesters	3.0	3.3	4.8	3.1	1.1	1.4	1.9	5.1	3.2	4.3	4.2
	(.6)	(.9)	(1.7)	(1.3)	(.7)	(.9)	(.9)	(1.9)	(1.3)	(1.9)	(2.9)
n	3,259	650	277	311	446	293	429	223	340	194	90

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

Female students with disabilities and their male peers largely progressed through the grade levels in similar fashion, as did students from households with different income levels. However, there is evidence, especially early in high school, that African American students with disabilities were somewhat more likely to require 3 or more semesters to complete a grade level (e.g., in 9th grade, 10% vs. 3%, $p<.05$). As was the case in a number of other gaps between African American and white youth, the difference decreased over time and was virtually nonexistent in 12th grade (Table 3-12).

Table 3-12

SEMESTERS TO COMPLETE GRADE LEVELS, BY SELECTED STUDENT CHARACTERISTICS

	Gender		Ethnic Background			Household Income		
	Male	Female	White	African American	Hispanic	<$12,000	$12,000 to $24,999	≥$25,000
Percentage completing grade level in semesters indicated in:								
9th grade								
2 Sem + Summer	6.0	5.6	6.3	6.2	4.8	5.0	4.4	7.4
	(1.1)	(1.5)	(1.2)	(2.1)	(3.1)	(1.8)	(1.6)	(1.6)
3+ Semesters	4.1	7.0	2.9	9.5	9.0	5.7	5.1	2.6
	(.9)	(1.6)	(.8)	(2.5)	(4.1)	(2.0)	(1.7)	(1.0)
n	1,819	1,155	1,685	520	305	563	653	1,105
10th grade								
2 Sem + Summer	5.4	5.8	3.9	8.4	11.1	5	3.1	6.1
	(1.0)	(1.5)	(.9)	(2.4)	(4.8)	(1.9)	(1.4)	(1.5)
3+ Semesters	5.7	4.9	4.0	10.7	6.1	7.3	4.3	3.4
	(1.1)	(1.4)	(1.0)	(2.7)	(3.6)	(2.3)	(1.6)	(1.2)
n	1,756	1,101	1,625	501	291	531	629	1,077
11th grade								
2 Sem + Summer	7.1	4.4	5.3	10.8	12.7	7.9	5.2	6.6
	(1.2)	(1.4)	(1.1)	(3.0)	(5.2)	(2.4)	(1.8)	(1.6)
3+ Semesters	3.3	2.9	2.5	5.2	2.5	4.3	4.1	2.2
	(.8)	(1.1)	(.8)	(2.1)	(2.5)	(1.8)	(1.6)	(.9)
n	1,685	1,080	1,631	446	276	510	618	1,082
12th grade								
2 Sem + Summer	2.4	1.4	1.6	3.2	4.8	1.9	1.4	2.3
	(.7)	(.7)	(.6)	(1.6)	(3.3)	(1.2)	(.9)	(1.6)
3+ Semesters	3.3	2.4	2.7	3.6	4.7	2.8	2.0	3.6
	(.8)	(1.0)	(.7)	(1.7)	(3.3)	(1.4)	(1.3)	(.9)
n	1,970	1,285	1,955	508	290	566	698	1,082

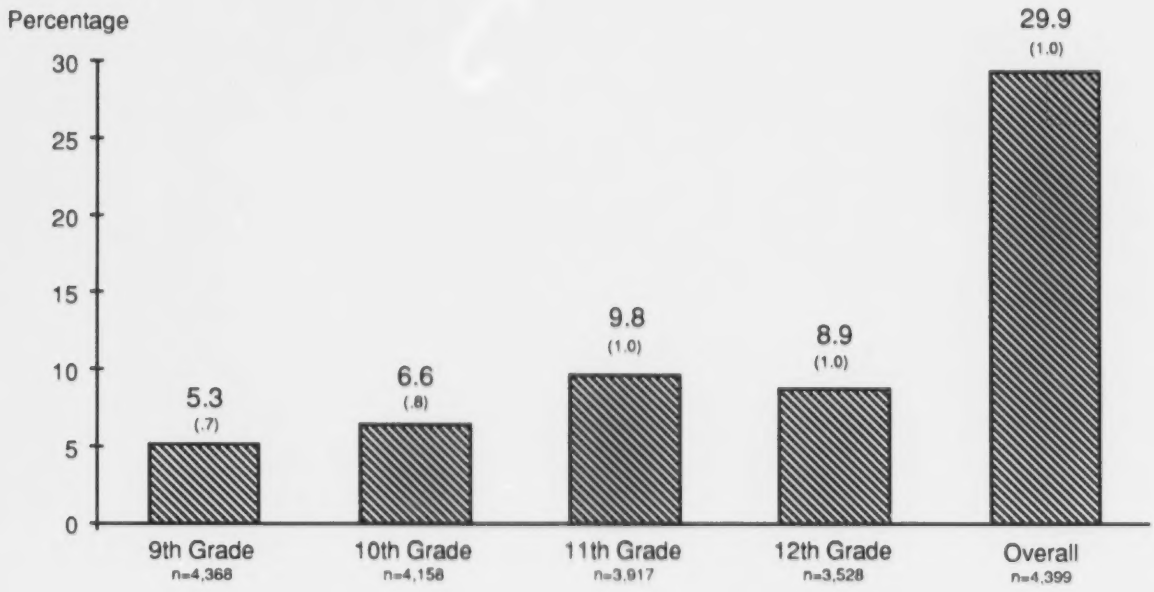
Standard errors are in parentheses.

Dropping Out

Of all of the performance indicators that we have addressed thus far, none is as important or complicated, or is associated with as many postschool problems, as the failure to complete secondary school. This problem is related to a combination of individual, family, school history, and school program issues. Regardless of the causes, there is a large body of evidence indicating that students who do not complete their secondary schooling face a difficult world as adults (Lichtenstein, 1993; Thornton and Zigmond, 1987; Wagner, Blackorby, Cameto, and Newman,1993). Their experiences are characterized, for example, by lower levels of employment and wages and higher rates of problems with the law.

Figure 3-5 shows the overall percentage of students with disabilities who dropped out of school in 9th through 12th grades. Approximately 30% of students with disabilities who had been enrolled in 9th through 12th grades failed to complete their secondary schooling. Earlier NLTS findings showed that approximately 8% of students with disabilities dropped out of school before enrolling in 9th grade. Interestingly, somewhat fewer students with disabilities dropped out in the first 2 years of high school than the final 2 ($p<.01$ between 9th and 12th grades). The estimate of a 38% dropout rate is consistent with estimates from other local and state studies that have found dropout rates to be in the 35% to 45% range (Blackorby, Edgar, and Kortering, 1991; Hasazi, Gordon, and Roe, 1985; Zigmond and Thornton, 1985). However, the findings differ in the sense that previous studies have found that greater numbers of students with disabilities leave school early in their high school careers.

On average, dropouts from high school were 18 years old when they left school. Despite having spent many years in school, they had earned an average of only 10 credits at the point they dropped out, showing the detrimental effects of course failure on the accumulation of credits by dropouts.



Standard errors are in parentheses.

* Does not include 8% of school leavers who dropped out before 9th grade.

FIGURE 3-5 PERCENTAGE OF YOUTH WHO DROPPED OUT OF 9TH THROUGH 12 GRADES*

As previous NLTS findings and other research have found, disability category is an extremely important factor in the likelihood of completing secondary school (Table 3-13). As was the case in a number of performance measures, students with serious emotional disturbances were far more likely than peers in any other disability category to drop out of high school (e.g., cumulatively, 48%; at least $p<.01$). In addition, students with mental retardation, learning disabilities, other health impairments, or speech impairments dropped out in substantial numbers (23% to 30%). On the other hand, students who were hearing or visually impaired or who had multiple handicaps were least likely to leave school before graduation (11% to 15%). These findings are consistent with other dropout research in special education (Zigmond and Thornton, 1985).

Table 3-13

PERCENTAGE DROPPING OUT OF 9TH THROUGH 12TH GRADES, BY DISABILITY CATEGORY

		Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
Percentage dropping out in:											
9th grade		4.4	8.6	6.1	7.3	1.8	3.5	1.1	1.3	5.4	.7
		(.9)	(1.8)	(1.7)	(1.4)	(1.0)	(1.1)	(.9)	(.8)	(1.9)	(1.1)
	n	889	475	396	635	374	522	262	421	270	118
10th grade		5.5	14.9	3.8	7.4	4.7	2.5	.5	3.2	7.5	1.7
		(1.1)	(2.4)	(1.4)	(1.5)	(1.6)	(1.0)	(.6)	(1.2)	(2.3)	(1.8)
	n	848	431	369	590	367	505	259	413	254	116
11th grade		9.6	16.2	7.1	9.5	3.4	4.7	5.9	4.1	11.4	7.3
		(1.4)	(2.7)	(1.9)	(1.7)	(1.4)	(1.4)	(2.1)	(1.4)	(2.9)	(3.5)
	n	794	368	351	550	350	491	258	400	235	114
12th grade		9.7	16.0	6.1	5.5	2.2	3.3	3.5	4.4	4.7	1.5
		(1.5)	(2.9)	(1.9)	(1.4)	(1.1)	(1.2)	(1.7)	(1.5)	(2.1)	(1.7)
	n	699	305	319	488	329	465	239	370	202	106
Cumulative		28.5	48.1	23.4	29.9	12.1	14.9	11.3	13.5	27.4	13.5
		(2.0)	(3.1)	(2.9)	(2.5)	(2.4)	(2.2)	(2.8)	(2.4)	(3.8)	(4.5)
	n	897	483	398	643	375	523	263	420	271	120

Standard errors are in parentheses.

* Does not include 8% of school leavers with disabilities who dropped out before 9th grade (Wagner, 1991c).

Demographic factors also often are related to the failure to complete secondary school. Although students of both genders appear to have left school in equal numbers, both overall and at each grade level, both ethnic background and household income were related to the rate at which students with disabilities dropped out (Table 3-14). White students dropped out in smaller numbers than their African American or Hispanic peers (25% vs. 38% and 34%; $p<.01$). Further, students from more well-to-do families dropped out less often than their

peers from families of lesser means. For example, 23% of students from families earning $25,000 or more per year, compared with 31% and 37% of their peers from families earning between $12,000 and $24,999 and less than $12,000, respectively ($p<.05$ comparing the lowest and highest income categories). These findings are consistent with much previous research that poor students and students from minority groups are at greater risk for dropping out of school.

Table 3-14

PERCENTAGE DROPPING OUT OF 9TH THROUGH 12TH GRADES, BY SELECTED STUDENT CHARACTERISTICS

		Ethnic Background			Household Income		
		White	African American	Hispanic	<$12,000	$12,000 to $24,999	≥$25,000
Percentage dropping out in:							
9th grade		3.6	7.5	7.9	8.5	6.1	2.3
		(.7)	(2.0)	(3.6)	(2.0)	(1.6)	(.8)
	n	2,523	742	397	819	939	1,661
10th grade		4.8	8.1	9.9	7.7	5.3	4.8
		(.9)	(2.1)	(4.1)	(1.9)	(1.6)	(1.1)
	n	2,428	692	378	762	887	1,623
11th grade		8.1	10.8	13.1	13.2	9.3	7.0
		(1.2)	(2.5)	(4.9)	(2.6)	(2.1)	(1.4)
	n	2,313	642	355	710	830	1,565
12th grade		8.0	14.1	7.0	11.3	10.1	8.3
		(1.2)	(3.1)	(4.0)	(2.6)	(2.3)	(1.6)
	n	2,112	567	318	617	748	1,447
Cumulative		24.9	38.5	33.7	37.3	30.9	23.1
		(1.7)	(3.6)	(6.2)	(3.4)	(3.1)	(2.2)
	n	2,541	751	399	826	951	1,666

Standard errors are in parentheses.

Relationships Among Performance Measures

As suggested by the conceptual framework, measures of student performance are related to one another. Further, some of measures relate to disability in very similar ways. For example, students with serious emotional disturbances did the least well among their peers on a host of outcome measures. However, there is not a one-to-one correspondence between measures.

Table 3-15 presents correlations among absenteeism, GPA, course failure, and dropping out for students who had 4 years of data.* The measures of reading and mathematics levels and the behavior scales from the teacher survey also are included. The strongest correlations occur between variables that are naturally related. For example, GPA is highly negatively correlated with the number of course failures ($r = -.77$; $p<.001$). We also note that ability levels in reading and mathematics are strongly positively correlated ($r = .79$; $p<.001$). Similarly, the two teacher ratings of student behavior, the behavioral norm and task performance scales, are strongly positively correlated ($r = .53$; $p<.001$).

Table 3-15

CORRELATIONS AMONG PERFORMANCE MEASURES

	Absences	GPA	Failed Class	Dropout	Math Level	Reading Level	Behavioral Norm Scale
GPA	-.45***						
Failed class	.48***	-.77 ***					
Dropout	.46***	-.60 ***	.69 ***				
Mathematics grade level†	-.01	.05	.03	.01			
Reading grade level†	.04	.03	.02	.03	.79***		
Behavioral norm scale†	-.16***	.33 ***	-.23 ***	-.11 *	.20***	.16***	
Task performance scale†	-.21***	.45 ***	-.30 ***	-.18 ***	.15**	.14**	.53***

* $p<.05$; ** $p<.01$; *** $p<.001$.
† For subset of students only.

Correlations between less similar measures are somewhat smaller but still significant. Higher absenteeism, for example, is moderately correlated with lower GPA ($r = -.45$; $p<.001$) and higher probabilities of dropping out ($r = .46$; $p<.001$) and failing classes ($r = .48$; $p<.001$).

It is interesting to note the lack of relationship between reading and mathematics levels and most other performance measures. According to these simple correlations, course grades had virtually nothing to do with the reading and mathematics abilities of students in the courses.

* Single-year analyses also were conducted. Only the 4-year results are presented because of the similarities in the relationships across grade levels.

There are at least three possible explanations for these findings. It is possible that the standardized tests on which those levels were established measured skills that were substantially different from those encountered in school-based evaluations such as grades. Alternatively, comparatively little variation in the reading and math levels might depress correlation coefficients. Finally, the relationship could be confounded with other factors, requiring multivariate analyses to disentangle (see Chapter 5). An exception to the lack of relationships involving reading and mathematics abilities was their significant, though small, positive relationships to teacher ratings of student behaviors, suggesting that more capable students were rated somewhat more highly by their teachers on task performance and in-class behaviors.

In contrast to the relatively weak relationships involving student abilities, student behaviors were correlated with all other measures of performance in the expected directions. Better student behavior, measured by both the behavioral norm and task performance scales, was related to lower rates of absenteeism, dropping out, and course failure and to higher reading and math abilities, as mentioned above. The task performance scale was somewhat more strongly correlated with absenteeism, grades, and dropout rates than was the behavior scale. This may suggest that the performance of students on schooling tasks, such as completing homework, is somewhat more strongly related to teacher evaluations of academic performance as reflected in grades. However, the task scale also was somewhat more strongly correlated with student behaviors indicated by absenteeism and dropping out, suggesting perhaps their shared roots as measures of students' connectedness to school.

These descriptive findings are a first step in understanding the complexity of school performance for students with disabilities. The next chapter will further elaborate the NLTS conceptual framework of factors expected to help explain the variations portrayed here.

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4 FACTORS EXPECTED TO RELATE TO STUDENTS' PERFORMANCE IN SECONDARY SCHOOL

The preceding chapter demonstrates that many aspects of student performance are problematic for students with disabilities and that performance is quite variable among students who differ in their primary disability and other characteristics. These descriptive findings are helpful in highlighting the parameters of educational outcomes for students with disabilities, but they do not help us to understand them. What explains variations in student performance? What are the individual risk factors associated with poor educational outcomes? What aspects of schools and school programs can help ameliorate the effects of those risk factors and, thereby, help students to succeed? How do influences on the pattern of performance unfold over time?

The conceptual framework introduced in the first chapter encapsulates the factors that are expected to help us understand the complex phenomenon of student performance. In this chapter, we elaborate on the following categories of factors that are hypothesized to relate to variations in educational outcomes:

- Disability-related characteristics
- Individual demographic factors
- Household characteristics
- Student behaviors
- Student programs
- School characteristics.

These factors are considered in their order of proximity to the student, hypothesizing that more individualized factors, such as characteristics of the student himself or herself or of the student's own school program, will have stronger relationships to performance than more distal factors, such as characteristics of the school the student attended. For each category, we discuss the several variables that we have examined in relation to school performance, summarizing important aspects of the variables and related research that suggest their direction of relationship to outcomes. We also illustrate important complexities and interrelationships among factors, understanding that many characteristics of students, their households, and their school experiences are intertwined and have both direct and indirect relationships to student performance, as the conceptual framework illustrates. The complexity of these interrelationships argues for the multivariate analysis approach whose findings we report in Chapter 5.

Disability-Related Factors

Primary Disability Category

Throughout the work of the NLTS, we have documented the wide diversity of experiences and outcomes of young people who differ in their primary disability. In the preceding chapter, we continued in this vein, demonstrating the differences in many aspects of school performance for students with different primary disability classifications, as assigned by their schools or school districts.

In addition to this expected direct relationship between disability and outcomes, we also know that disability influences the nature of students' school programs, thereby having an indirect relationship to performance. By law, a student's educational program must reflect an assessment of his/her needs, as conditioned by his/her disabilities and as defined in the student's individualized education plan (IEP). This confounding of disability and program means, for example, that we cannot directly compare the performance of students in regular and special education classes and interpret the results as indicative of the relationship of placement to performance because the students in those classes differed from each other in ways that could have had important influences on performance. In this example, we would not know whether it was student characteristics or placement that explained differences in the performance of students in regular and special education classes. Therefore, our analyses include disability category, not only to determine the relationship of disability to performance, but also to disentangle its interrelationships with school program factors so that their relationship to performance is more clear.

Functional Skills

The functional limitations imposed by disability vary widely for students in the same disability category (Marder and Cox, 1991). To understand the relationship between school performance and functional abilities, given a student's primary disability, we have included four measures of functional skills: a self-care skills scale, a functional mental skills scale, and teacher reports of the grade levels at which students functioned in reading and mathematics.

Self-care skills. In telephone interviews, parents were asked to report their children's ability to perform three basic self-care tasks completely, on their own, without help: dress themselves, feed themselves, and get around to places outside the home, such as to a neighbor's home or a nearby park. Parents reported whether their child could do each task "very well," "pretty well," "not very well," or "not at all well." Responses were given values ranging from 1 (not at all well) to 4 (very well). Values were summed to create a scale ranging from 3 (all tasks performed not at all well) to 12 (all tasks performed very well).

Functional mental skills. Similar to the self-care scale, parents were asked to report their children's ability to perform four tasks that entailed applying basic mental skills to everyday

tasks: telling time on a clock with hands, reading common signs, counting change, and looking up names in the telephone book and using the phone. Again, parents reported whether their child could do each task "very well," "pretty well," "not very well," or "not at all well," and responses were scored from 1 (not at all well) to 4 (very well). Values were summed to create a scale ranging from 4 (all tasks performed not at all well) to 16 (all tasks performed very well).

Table 4-1 indicates the percentages of youth in each disability category who were reported by parents to have high, medium, and low self-care and functional mental skills. These figures demonstrate the wide range of functional abilities among students with the same primary disability distinction. For example, among youth classified as visually impaired, almost one-third were reported to have high functional mental skills, whereas 20% of youth in the same category had low functional mental skills.

We expect that students with lower abilities, as measured by the self-care scale, would be absent from school more because of illness or therapies, but would be less likely to drop out, instead being more prone to stay in school to the maximum age limit. Additionally, we would expect students with higher functional mental skills to be less likely to fail courses, other factors being held constant.

Tested Grade Levels for Reading and Mathematics

In addition to these functional scales, we have assessed the influence on student performance of reading and mathematics grade levels, based on standardized tests. In the general population of youth, research has demonstrated that grades are a function, in part, of tested cognitive ability (Fetters, Brown, and Owings, 1984).

To examine the relationship of tested ability to other aspects of student performance, a difference score measures the years between students' assigned grade levels at the time of testing and their functional grade levels in reading and mathematics. This yields a negative differential for students who functioned below grade level, a positive differential for those who functioned above grade level, and a zero differential for those whose reading and mathematics abilities were tested to be at grade level. We expect a direct association between higher tested abilities and a lower probability of course failure. However, there may well be little direct relationship to absenteeism or dropping out, in the latter case because the lowest-functioning youth tended to stay in school until they aged out.

Chapter 3 indicated the reading and math differentials for students with disabilities and the confounding of these tested abilities with disability category and ethnic background, reinforcing the importance of a multivariate analysis strategy to disintangle their separate effects (see Table 3-3 in Chapter 3).

Table 4-1

VARIATIONS IN SELF-CARE AND FUNCTIONAL MENTAL SKILLS SCALE SCORES, BY DISABILITY CATEGORY

	Percentage with Self-Care Skills Scale Score* of:			Mean Scale	Percentage with Functional Skills Scale Score* of:			Mean Scale	
	High	Medium	Low	Score	High	Medium	Low	Score	n
All conditions	93.8 (.8)	5.0 (.7)	1.2 (.1)	11.6 (<.1)	60.3 (1.7)	35.0 (1.6)	4.7 (.7)	13.8 (.1)	4,330/4,242
Learning disabled	98.0 (.7)	2.0 (.7)	0 –	11.9 (<.1)	66.7 (2.4)	32.0 (2.4)	1.3 (.6)	14.6 (.1)	802/785
Emotionally disturbed	97.2 (1.1)	2.7 (1.1)	.1 (.2)	11.9 (<.1)	68.1 (3.2)	31.0 (3.1)	1.9 (.9)	15.5 (.1)	441/433
Speech impaired	96.7 (1.3)	2.8 (1.2)	.4 (.5)	11.8 (.1)	71.4 (3.4)	24.2 (3.2)	4.3 (1.5)	14.4 (.2)	384/379
Mentally retarded	84.7 (1.9)	12.3 (1.8)	3.1 (.9)	10.9 (.1)	38.3 (2.7)	47.3 (2.7)	14.4 (1.9)	11.7 (.2)	619/597
Visually impaired	76.1 (3.8)	22.1 (3.7)	1.0 (1.2)	10.8 (.1)	35.6 (4.4)	53.0 (4.6)	11.4 (2.9)	12.1 (.2)	376/357
Hard of hearing	94.3 (1.8)	5.7 (1.8)	0 –	11.8 (<.1)	63.8 (3.8)	34.7 (3.8)	1.5 (1.0)	14.3 (.2)	508/507
Deaf	95.0 (2.3)	5.0 (2.3)	0 –	11.7 (.1)	54.1 (5.3)	44.3 (5.3)	1.6 (1.3)	13.7 (.2)	255/249
Orthopedically impaired	56.4 (3.9)	31.2 (3.6)	12.4 (2.6)	9.8 (.2)	48.6 (3.9)	46.0 (3.9)	5.4 (1.8)	13.5 (.2)	441/441
Other health impaired	77.7 (3.6)	18.0 (3.3)	4.2 (1.7)	10.9 (.2)	52.3 (4.3)	35.5 (4.2)	8.3 (2.4)	13.6 (.2)	294/289
Multiply handicapped	46.6 (6.2)	21.2 (5.1)	22.2 (5.8)	8.3 (.3)	16.8 (4.7)	38.4 (6.1)	44.7 (6.3)	8.5 (.3)	203/198

Notes: "All conditions" includes students in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students. Percentages are for the 1986-87 school year. Standard errors are in parentheses.

* The self-care scale ranges from 3 to 12. High ability is a score of 11 or 12, medium is a score of 8 to 10, and low is a score of 3 to 7. The functional mental skills scale ranges from 4 to 16. High ability is a score of 15-16, medium is a score of 9 to 14, and low is a score of 4 to 8.

Source: Parent interviews

Individual Demographic Characteristics

Gender

Research regarding students in the general population has found a significant gender difference in student performance that favors females, although no difference in dropout rates is found when other student characteristics are controlled (Kaufman and Bradby, 1992). Chapter 3 documented gender differences in performance for students with disabilities as well, as in the higher GPAs shown for female students in Table 3-9. However, gender relationships to performance were complex, because male and female students with disabilities had important differences in their school programs that might also have influenced performance, particularly in the area of vocational education. For example, although male and female students were about equally likely to have enrolled in vocational education during secondary school, female students were significantly less likely to take vocational education in their early years or to concentrate in a vocational area (i.e., take 4 or more semesters in a single vocational area; Blackorby, 1993). Gender also is confounded with disability in that some disability categories have a considerably higher proportion of males than others. For example, males were 77% of secondary school students with serious emotional disturbances and 72% of those with learning disabilities, but 60% or fewer or all other categories of students. This suggests that gender should be included in our analyses both to identify its direct relationship to performance and to control for its relationship to school programs and disability. Earlier NLTS multivariate analyses that featured controls for other student and program characteristics concluded that males were significantly more likely than females to receive failing grades, other factors being held constant (Wagner, 1991), but gender was not found to have an independent relationship to absenteeism or dropping out of school. We expect similar relationships to result from the present analysis.

Ethnic Background

Membership in an ethnic minority group is commonly considered a risk factor for poor student performance in the general population. NLTS findings presented in Chapter 3 suggested that African American and Hispanic students were absent, failed courses, and dropped out more often than their white peers, particularly in the early years of secondary school. However, the relationship of ethnic background to student performance is not straightfoward because it is intimately related both to being poor and to attending poor schools, which also relate strongly to student performance. Among students with disabilities, NLTS findings also have demonstrated that students of different ethnic backgrounds had quite different school experiences. In particular, minority students with disabilities were significantly less likely than white students to be enrolled in regular education academic courses, particularly in the early years in secondary school (Newman, 1993); they also earned fewer credits in occupationally specific vocational education (Blackorby, 1993). Thus, ethnic background might indirectly affect school performance through differences in school programs.

Earlier NLTS multivariate analyses controlled for several of these confounding factors and found a direct relationship between ethnic background and school performance (Wagner, 1991), with minority students being more likely than white students to receive failing grades but less likely to drop out of school, other factors being held constant statistically. Similar relationships are hypothesized for these analyses. The present analyses go beyond earlier NLTS work by differentiating African American and Hispanic students from others, rather than examining the effects of being minority students as a single group. This differentiation builds on the work of Newman (1992), who found that the school programs of Hispanic students differed significantly from those of both white and African American students.

Household Characteristics

Three aspects of students' households are included in our analyses as proxies for the more complex constellation of factors in the home lives of students that can influence their ability to perform well in school: annual household income, whether the student came from a two-parent household, and teachers' reports of the extent to which parents were involved in students' secondary school experiences.

Household Income

Poverty is disproportionately a circumstance of students with disabilities, among whom 35% lived in households with 1987 incomes of less than $12,000 per year, compared with 18% of the general population of students (U.S. Bureau of the Census, 1988; $p<.001$). Student poverty is a common risk factor for poor student performance in the general population (Kaufman and Bradby, 1992; Eckstrom, Goertz, Pollack, and Rock, 1989; Rumberger, 1987). Chapter 3 also has shown significant differences in student performance in bivariate analyses for students with disabilities (see Tables 3-2, 3-9, and 3-12).

NLTS data also suggest that poverty is reflected in students' school programs. In particular, low-income students with disabilities earned fewer academic credits in 4 years, were less likely to be enrolled in regular education for their academic courses, and were less likely to receive support services than their more affluent peers (Wagner, 1993). Even controlling for the interrelationships of poverty with school programs, however, earlier NLTS multivariate analyses found that poor students had both higher absenteeism and a higher probability of course failure than others (Wagner, 1991). Similar relationships are expected in the present analyses. However, income was measured for most students in 1987, although their school performance spans multiple years. The explanatory power of this factor will be diminished by the extent to which the income of the household changed during the years in which school performance was measured.

Two-Parent Household

Among students in the general population, those from intact, two-parent families have been shown to do better in school than students from single-parent families (Kaufman and Bradby, 1992), although this factor is seriously confounded with ethnic background and household income. Students with disabilities are more likely to come from single-parent families than are those in the general population (37% vs. 26%; U.S. Census, 1988), and earlier NLTS multivariate analyses have shown a direct relationship between coming from a two-parent family and lower absenteeism when these other aspects of students' backgrounds are controlled for (Wagner, 1991). We continue to expect students from two-parent households to exhibit better school performance than students from one-parent households, perhaps because they have more parent supervision and less time on their own than students from single-parent households.

The present analyses include a dichotomous variable indicating whether the student's household of origin was a two-parent household. As with income, this factor was measured, for most students in 1987; if household circumstances changed during the years in which school performance was measured, the explanatory power of this factor will be diminished. Nevertheless, it is an important indicator of household background.

Parental Support for Education

There is a powerful consensus among educators that parental involvement in and support for their children's education is a key factor in children's educational success—a consensus borne out in research. For example, among 8th-graders in the general population, Kaufman and Bradby (1992) found that students with parents who had little involvement in their schooling were about 40% more likely to perform below basic reading and mathematics levels for their grade levels and were more than twice as likely to drop out of school as were children of parents with moderate involvement; the relationships were maintained even when controlling for differences in gender, ethnic background, and socioeconomic status.

To establish the relationships between parental support for education and school performance for a subset of 12th-grade students with disabilities, teachers were asked to report "how involved have this student's parents been in his/her secondary school experiences (e.g., helping with homework, monitoring student's progress in school)?" A 4-category variable indicates whether parents were "not at all involved" (a value of 1) to "very involved" (a value of 4).

Table 4-2 shows that fewer than one-fourth of 12th-graders with disabilities had parents whom teachers described as very involved in their school experiences (23%). However, fewer than 1 in 10 had parents who were described as not at all involved (9%). No systematic differences were apparent among students with different disabilities, although students with speech impairments were significantly less likely than those with physical or multiple

impairments to have parents who were not at all involved in their school experiences (2% vs. 18%; $p<.05$). Although teachers may not, in all cases, have had a complete or accurate sense of parental involvement in all cases, much of which goes on in the home, not at school, they do gain a perspective on parent involvement and support through their interactions with their students. Despite possible inaccuracies in measurement, we expect teacher reports of stronger parental support to relate to lower absenteeism and course failure for students with disabilities, as parental involvement does for students in the general population. (An analysis of the relationship to dropping out is not included because the subset of students with values on this variable were virtually all 12th-graders and thus were not dropouts.)

Table 4-2

TEACHER REPORTS OF PARENTAL INVOLVEMENT IN 12TH-GRADE STUDENTS' EDUCATIONS

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Sensory Impaired	Other
Percentage with teachers reporting parents' involvement in education as:							
Very involved	23.3	21.4	23.0	33.3	25.1	26.0	33.9
	(3.3)	(4.7)	(7.9)	(8.6)	(5.3)	(7.4)	(7.9)
Fairly involved	41.2	43.0	31.6	38.0	42.3	31.2	31.7
	(3.8)	(5.7)	(8.7)	(8.8)	(6.0)	(7.8)	(7.8)
Not very involved	26.8	26.9	32.0	26.4	25.8	35.3	16.2
	(3.4)	(5.1)	(8.8)	(8.0)	(5.3)	(8.1)	(6.1)
Not at all involved	8.6	8.7	13.4	2.3	6.6	7.5	18.3
	(2.2)	(3.2)	(6.4)	(2.7)	(3.0)	(4.5)	(6.5)
n	656	161	71	93	140	91	100

Standard errors are in parentheses.

Source: Survey of Secondary School Programs.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

Student Behaviors

Much previous research has demonstrated that, regardless of disability, students engage in activities and exhibit behaviors that influence aspects of their school performance (Jay and Padilla, 1987; U.S. General Accounting Office, 1987; Wehlage and Rutter, 1986; Vito and Connell, 1988; Zigmond, 1987; Alpert and Dunham, 1986; Mahan and Johnson, 1983; Thornton et al., 1987). Three types of student behaviors are considered in the present analyses: social behaviors, prior performance in school, and in-class behavior.

Social Behaviors

The NLTS assessed the extent to which students had individual friendships by asking them or their parents to report how many days per week students typically "saw friends outside of school." Responses ranged from "never" to "6 or 7." As a measure of group affiliation, we assessed whether students belonged to school or community groups. Table 4-3 demonstrates that students generally were quite active in having individual friendships, but were less involved in groups. Further, there were significant differences in social involvement for students in different disability categories. Newman (1991) has further demonstrated the confounding effects of social activity and disability, showing that students with higher functional abilities were more actively involved with friends.

Table 4-3

SOCIAL ACTIVITIES OF STUDENTS WITH DISABILITIES WHO ATTENDED REGULAR SECONDARY SCHOOLS

	Percentage Belonging to Groups While in School	Percentage Seeing Friends: Less than Weekly	1-3 Times Weekly	4-5 Times Weekly	> 5 Times Weekly	n
All conditions*	42.6 (1.8)	10.7 (1.0)	38.0 (1.6)	16.9 (1.3)	34.4 (1.6)	4,256/3,683
Learning disabled	45.6 (2.8)	7.6 (1.4)	37.2 (2.5)	18.0 (2.0)	37.2 (2.5)	777/627
Emotionally disturbed	37.3 (3.5)	8.3 (1.9)	31.0 (3.2)	18.5 (2.7)	42.2 (3.4)	422/375
Speech impaired	47.8 (4.0)	9.8 (2.2)	42.3 (3.7)	15.3 (2.7)	32.6 (3.5)	382/334
Mentally retarded	33.5 (2.8)	18.5 (2.1)	41.6 (2.7)	13.8 (2.7)	26.0 (2.4)	598/519
Visually impaired	50.5 (4.8)	15.9 (3.3)	45.4 (4.5)	14.7 (3.2)	24.0 (3.8)	372/339
Hard of hearing	45.9 (4.2)	13.0 (2.7)	41.8 (3.9)	18.6 (3.1)	26.6 (3.5)	508/458
Deaf	55.9 (5.8)	12.8 (3.6)	44.8 (5.3)	14.5 (3.8)	28.0 (4.8)	253/214
Orthopedically impaired	40.4 (4.1)	26.0 (3.4)	43.9 (3.9)	11.5 (2.5)	18.7 (3.0)	445/385
Other health impaired	35.2 (4.3)	21.1 (3.6)	46.5 (4.4)	12.5 (2.9)	20.0 (3.5)	292/269
Multiply handicapped	33.0 (6.1)	40.7 (6.0)	35.4 (5.8)	8.4 (3.4)	15.5 (4.4)	200/184

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students. Percentages are for the 1986-87 school year.

We have hypothesized that students who had strong group affiliations, as indicated by their membership in school or community groups, would have better school attendance and performance than less-affiliated students, a relationship strongly supported in other NLTS work, which showed that group members had significantly lower absenteeism and course failure and dropout rates than students with disabilities who were not affiliated with school or community groups (Wagner, 1991). In contrast, we expect students whose affiliation was primarily with individual friendships outside of school to have lower engagement in school, as indicated by higher absenteeism, and higher rates of course failure, as shown in earlier NLTS work (Wagner, 1991). Although earlier NLTS research did not find a significant association between seeing friends outside of school frequently and dropping out, we hypothesize that such a relationship would follow from the association of seeing friends to other indicators of school performance.

Prior School Performance

The second aspect of student behavior we consider involves school performance in past years, recognizing that students do not begin a school year with a "clean slate," but carry with them their past experience of absenteeism and course failures, experiences often known to the teachers with whom they interact and who assign them their grades. In the general population of students, past academic performance has been shown to relate powerfully to students' test scores and to the likelihood that they will drop out of school (Kaufman and Bradby, 1992).

Chapter 3 has shown similar strong connections between various aspects of school performance in a given grade. Our multivariate analyses posit that performance is cumulative and that past performance conditions current performance for students with disabilities. Because we have no direct measures of earlier school performance for 9th-graders, we use a dichotomous variable indicating whether the student was older than the typical age for 9th-graders as a proxy for having been retained one or more times at an earlier grade level. Kaufman and Bradby (1992) have found a significant and direct relationship between being overage and poor school performance, controlling for gender, ethnic background, and socioeconomic differences between students in the general population.

For analyses of 10th- through 12th-graders with disabilities, we use lag variables from prior grades. Specifically, we expect that a student's pattern of absenteeism in a given year will relate strongly to his or her pattern of absenteeism in past years. Further, we expect that both prior absenteeism and a history of course failure will influence both the probability of course failure in a given year and a student's decision to remain in or drop out of school. Finally, we expect the influence of prior performance to increase with each grade level as the cumulative pattern of performance develops over time.

Prior absenteeism is measured as the average number of days absent per semester in the preceding year(s) and is entered in the analysis of performance in 10th through 12th grades.

A history of course failure is indicated by a dichotomous variable for whether the student had received a failing grade in any course before that grade level.

In-Class Behavior

The third category of behavior we investigate involves students' in-class actions and their attentiveness to the tasks of learning. Particular measures of these behaviors are described in Chapter 3 and involve teachers' reports of students' compliance with behavioral norms (including getting along with other students, following directions, and controlling behavior in class) and attention to school work (including completing homework on time, taking part in group discussions, and staying focused on assigned work). Research on student performance in the general population has demonstrated the strong relationship between students' attentiveness to school activities and both test scores and the likelihood of dropping out (Kaufman and Bradby, 1992).

Tables 3-4 and 3-6 in Chapter 3 illustrate the range of variation on the behavioral norm and task performance scales for students with different primary disabilities, and Table 3-15 depicts correlations between these factors and other aspects of student performance. In multivariate analyses, we expect that students with higher scores regarding meeting behavioral norms will be more engaged in schooling and therefore have lower absenteeism and rates of course failure and dropping out. Attention to school tasks is expected to be most strongly associated with lower rates of course failure.

Students' School Programs

We expect that characteristics of students' academic and vocational courses, as well as support services they receive, will influence their school performance.

Academic Course-Taking

Virtually all students with disabilities took academic classes at each grade level in secondary school (Newman, 1993). Hence, the sharpest distinction among students is not whether they took academic classes, but the relative importance in the students' school programs of academic classes and the level or difficulty of those classes. Research on students in the general population suggests that students taking less-difficult classes have poorer school performance and are significantly more likely to drop out (Kaufman and Bradby, 1992). The data available to the NLTS allow us to calculate the relative proportion of a student's program that was devoted to academic courses. However, transcript data do not yield good measures of the level of difficulty of courses in all cases. Hence, as a proxy for difficulty level of courses, we distinguish regular education academic courses from special

education academic courses. Thus, the variable included in our analyses is the percentage of a student's class hours that were spent in regular education academic classes.

Table 4-4 indicates that more than one-fifth (22%) of students with disabilities spent 10% or less of their class time in regular education academic classes, and about the same proportion (27%) spent more than half their class time in those classes; the average was one-third of their time overall. Wide variation is noted for youth in different disability categories, with students with visual impairments spending the greatest time in regular education academic classes (57% of class time, on average) and students with mental retardation or multiple impairments spending the least time (14% and 12%; $p<.001$). Contrary to findings regarding the general population of students, we expect students with disabilities who spend more of their class time in regular education academic classes to have higher probabilities of course failure; no relationship to absenteeism or dropping out is hypothesized.

Table 4-4

PERCENTAGE OF CLASS TIME SPENT IN REGULAR EDUCATION ACADEMIC CLASSES, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
Percentage with time in regular education academic classes of:											
10% or less	22.5	13.8	13.0	12.7	61.9	6.5	16.5	32.8	22.2	15.7	66.1
	(1.9)	(2.2)	(3.4)	(2.9)	(3.9)	(2.2)	(2.7)	(4.8)	(3.5)	(4.0)	(7.6)
11% to 35%	27.8	32.1	23.6	7.9	22.9	6.0	19.1	21.0	13.1	19.7	17.8
	(2.0)	(3.0)	(4.3)	(2.4)	(3.4)	(2.1)	(3.9)	(4.2)	(2.9)	(4.4)	(6.1)
36% to 50%	22.6	27.8	25.0	16.9	6.7	12.2	15.1	23.2	13.4	11.2	7.1
	(1.9)	(2.9)	(4.4)	((3.3)	(2.0)	(2.9)	(2.6)	(4.4)	(2.9)	(3.5)	(4.1)
More than 50%	27.1	26.3	38.4	62.5	8.6	75.3	49.4	23.0	51.3	53.4	9.0
	(2.0)	(2.8)	(4.9)	(4.2)	(2.2)	(3.8)	(3.6)	(4.3)	(4.2)	(5.5)	(4.6)
n	2,175	393	164	215	261	215	319	158	239	137	70

Standard errors are in parentheses.

Source: Student transcripts

* All conditions includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students. Percentages are for the 1986-87 school year.

Vocational Course-Taking

One objective of secondary vocational education is "motivating students to remain in school" (Catterall and Stern, 1986; Weber and Mertens, 1987). In the general population, there is some evidence that, for students who remain in school until 11th grade, vocational education may provide curricular options that better fit the goals and interests of non-college-bound students (Lotto, 1988). Earlier NLTS analysis, based on school records only for students' most recent year in school, also suggests that occupational vocational education may have a dampening effect on dropping out, as well as benefiting other aspects of students' school performance (Wagner, 1991). These benefits of vocational training may accrue because students with disabilities find vocational courses to be more in line with their postschool goals than more academic pursuits. Among 12th-graders with transition plans for their postschool years, employment was a transition goal for 68% of students, compared with only 23% of students having college as a postschool transition goal (Cameto, 1993). Further, among youth with disabilities who had been out of school up to 2 years, 46% were working competitively for pay (D'Amico, 1991), whereas only 5% were attending a 2-year or 4-year college (Butler-Nalin and Wagner, 1991).

However, there is considerably greater variation in students' experiences with vocational education than a dichotomous variable can capture. Therefore, we extend our earlier analysis of vocational education and its relationship to school performance by considering two aspects of vocational education: intensity of instruction, and work experience.

Intensity of instruction. We measure intensity of involvement in vocational education in different ways for students at different grade levels to reflect the larger place that vocational education often takes in students' programs at successive grade levels. For 9th-grade students, we have analyzed the relationship between school performance and the number of hours students spent in occupationally specific vocational education during that year. For 10th-graders, we again include the hours spent in occupational vocational education, but we consider this along with a dichotomous variable indicating whether students had begun that instruction in the 9th grade or were first-time occupational students in 10th grade. By 11th grade, many students had had the opportunity to become "concentrators" in a vocational content area by taking 4 or more semesters of instruction in a particular area (e.g., agriculture). Some hypothesize that it is this concentration of instruction that builds skills that will later translate into real jobs; thus, students who are concentrators may see the value of their school experiences more than other students and be more engaged. If so, we would expect to see lower absenteeism and drop out rates associated with concentrators. A dichotomous variable is included in the analysis of performance for 11th and 12th grades that distinguishes vocational concentrators

However, Table 4-5 shows that concentrating in vocational education is not particularly common. More common is for students to have taken occupational courses but to have taken too few to be concentrators, or to have taken courses in different vocational areas. If

vocational education has particular relevance or "holding power" for students with disabilities, we would also expect to see lower absenteeism and dropout rates for students taking these "survey" courses than for students who took prevocational courses only or no vocational education at all. To test this hypothesis, the analyses of performance for 11th- and 12th-grade students also includes a dichotomous variable for students who took occupational survey courses only (prevocational and nonvocational students are the comparison category for both dichotomous variables).

Table 4-5

VOCATIONAL EDUCATION COURSE-TAKING, BY DISABILITY CATEGORY

	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
Percentage with no vocational education through:										
11th gade	1.2	4.7	5.0	2.5	10.8	7.4	2.5	8.7	3.6	3.0
	(.7)	(1.9)	(1.8)	(1.1)	(2.7)	(1.8)	(1.5)	(2.3)	(1.9)	(2.6)
12th grade	.8	.6	1.7	2.3	4.2	2.5	2.2	2.9	4.2	7.9
	(.6)	(.8)	(1.1)	(1.2)	(1.8)	(1.1)	(1.5)	(1.4)	(2.2)	(4.3)
Percentage with prevocational courses only through:										
11th grade	4.6	4.2	4.5	10.1	6.8	3.9	4.3	8.7	9.9	27.2
	(1.3)	(1.8)	(1.7)	(2.2)	(2.2)	(1.4)	(2.0)	(2.3)	(3.1)	(6.9)
12th grade	1.9	1.9	3.9	5.8	4.7	2.9	.7	5.6	5.5	15.8
	(.9)	(1.4)	(1.7)	(1.9)	(1.9)	(1.2)	(.8)	(1.9)	(2.5)	(5.9)
Percentage with survey courses (no concentration) through:										
11th grade	72.2	78.9	77.3	78.3	72.9	77.5	86.6	74.0	76.9	63.1
	(2.7)	(3.7)	(3.5)	(3.0)	(3.3)	(2.9)	(3.4)	(3.6)	(4.3)	(7.4)
12th grade	57.0	71.2	64.6	71.0	72.0	68.2	73.9	70.8	66.5	59.8
	(3.2)	(4.5)	(4.2)	(3.6)	(4.0)	(3.4)	(4.5)	(3.8)	(5.2)	(7.9)
Percentage with concentration through:										
11th grade	22.0	12.1	13.3	9.1	9.5	11.1	6.6	8.6	9.6	6.6
	(2.5)	(3.0)	(2.9)	(2.1)	(2.5)	(2.2)	(2.5)	(2.3)	(3.0)	(3.8)
12th grade	40.3	26.4	29.8	20.9	19.1	26.5	23.2	20.7	23.9	16.5
	(3.1)	(4.4)	(4.0)	(3.2)	(3.5)	(3.2)	(4.3)	(3.4)	(4.7)	(6.0)
11th grade n	443	198	231	316	228	342	169	258	160	76
12th-grade n	399	167	215	263	215	322	159	240	137	70
Percentage who participated in work experience program through 12th grade	38.7	29.7	32.4	44.9	26.9	33.5	39.7	40.4	38.0	49.6
	(2.2)	(2.9)	(3.1)	(2.5)	(3.1)	(2.7)	(4.1)	(3.1)	(3.8)	(4.9)
n	819	420	381	660	357	528	247	435	279	186

Standard errors are in parentheses.

Work experience. Since the early days of the transition movement, practitioners have stressed the importance of work experience for students with disabilities. Much research has suggested that students who had paid work experience during secondary school are more likely than students without such experience to find jobs for pay after leaving school (Hasazi, Gordon, and Roe, 1985). Earlier NLTS findings support this conclusion (D'Amico, 1991), suggesting that students who had work-study jobs in secondary school were 14 percentage points more likely than students without that experience to have found paid competitive jobs when they had been out of school up to 2 years ($p<.01$), controlling for other differences between students. Proponents also suggest that work experience, as part of a vocational education curriculum, further demonstrates the relevance of the vocational curriculum to students and increases student engagement in school.

Others contend, however, that the effects of working during school might be detrimental for students in that hours spent working were not spent doing homework. Further, the attractiveness of "premature prosperity" might make staying in school seem less advantageous than leaving school to work full time. Although no relationship was found in earlier NLTS work between having a paid job in a given school year and school performance in that year (Wagner, 1991), we revisit this hypothesis in the present analysis, focusing on the relationship to school performance of participation in school-sponsored work experience programs (in contrast to more general experience with paid employment, which could be unrelated to students' school programs).

Three variables are considered. In our main model, we investigate the relationship to school performance of a dichotomous variable indicating whether a student participated in school-sponsored work experience during the school year (see Table 4-5). In supplemental analysis involving primarily 12th-graders, we examine the effects of two variables indicating the percentage of a student's day that was involved in school-based work experience (e.g., helping in the school office) and the percentage of the day spent in community-based work experience.

Table 4-6 presents the distribution of these aspects of vocational education for students with disabilities. We hypothesize that greater involvement in work experience will relate to increased engagement in school (lower absenteeism) but will be unrelated to course failure rates. (An analysis of dropouts is not included because the subset of students with values for these variables were largely 12th graders.)

Table 4-6

TIME SPENT IN SCHOOL- AND COMMUNITY-BASED WORK EXPERIENCE, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Hearing Impaired	Orthopedically/ Other Health Impaired	Other
Percentage of time in school-based work experience								
None	57.1 (3.9)	60.0 (5.6)	64.0 (9.3)	66.8 (8.0)	46.4 (6.3)	41.4 (10.5)	43.4 (9.8)	46.6 (11.3)
< 50%	28.5 (3.6)	26.0 (5.0)	19.2 (7.6)	28.7 (7.7)	37.7 (6.1)	22.3 (8.9)	37.8 (9.6)	43.2 (11.2)
50% or more	14.5 (2.8)	14.0 (4.0)	16.8 (7.2)	4.5 (3.5)	15.8 (4.6)	36.3 (10.2)	18.7 (7.8)	10.2 (6.9)
n	637	163	68	102	128	62	68	46
Percentage of time in community-based work experience								
None	68.9 (3.6)	73.0 (5.1)	84.2 (7.1)	72.9 (7.5)	53.7 (6.2)	68.4 (10.1)	50.8 (9.9)	65.8 (11.6)
< 50%	21.1 (3.2)	20.0 (4.5)	9.8 (5.8)	19.0 (6.7)	30.7 (5.7)	15.2 (7.8)	20.8 (8.1)	10.9 (7.6)
50% or more	10 (2.3)	7.7 (3.0)	6.0 (4.6)	8.0 (4.6)	15.7 (4.5)	16.4 (8.1)	28.4 (9.0)	23.3 (10.3)
n	634	166	68	98	130	60	72	40

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students. Percentages are for the 1986-87 school year.

Support Services for Students

Students with disabilities often need support services in order to benefit from their academic or vocational instruction. Here, we investigate the relationships between having help from a human aide (a tutor, reader, or interpreter) or receiving personal counseling or therapy (e.g., individual or group counseling, psychotherapy, drug abuse counseling, etc.) and students' school performance. We hypothesize that the individual attention of these forms of assistance may increase students' engagement in school, as measured by lower absenteeism (Wehlage, Rutter, Smith, Lesko, and Fernandez, 1989) and, in the case of tutoring, improve school performance, as measured by a lower probability of course failure. These hypotheses are tested in the supplemental model focused primarily on 12th-graders.

Also in the supplemental analysis, we explore the potential contribution of support services offered to students in regular education classes. Although we have hypothesized that course failure is more common for students who spend more of their time in regular education academics, we also believe that such a placement will be less likely to lead to failure if students and their teachers are provided support in those settings. We explore the relationship of school performance to a variable indicating how many of the following support services were provided to students with disabilities in regular education classes*:

- Special materials
- Help in test taking
- Modified tests
- Modified grading standards
- Slower-paced instruction
- Study skills assistance
- Behavior management assistance
- Progress monitored by special education teacher
- Additional time to complete assignments
- Additional study time in special education classes
- Physical adaptations (e.g., preferential seating).

Table 4-7 indicates the extent to which students with disabilities received help from a human aide or personal counseling or therapy, as well as the number of nonhuman supports or accommodations students were provided in regular education classes. Assistance from a tutor, reader, or interpreter was provided to 36% of students, ranging from 14% of 12th-graders with speech impairments to 55% of those with sensory impairments (largely those with hearing impairments). Personal counseling or therapy was even less common, with 19% of 12th-graders receiving such help.

About one-fourth of students with serious emotional disturbances received counseling or therapy, as did 38% of students with physical, health, or multiple impairments. Overall, 36% of students received no accommodations in regular education (including those not in regular education); this percentage ranged widely, from 32% of students with mental retardation to 60% of students with speech impairments.

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* The summative measure counts as zero both students who had no support in regular education classes and students who has no regular education classes. A dichotomous variable is included in the model to distinguish students who had no regular education classes.

Table 4-7

SUPPORTS PROVIDED TO STUDENTS WITH DISABILITIES, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Sensory Impaired	Other
Percentage receiving from the school in the most recent school year:							
Help from a tutor, reader, or interpreter	35.7 (3.5)	37.7 (5.3)	36.3 (5.3)	14.5 (5.8)	33.1 (5.7)	54.7 (8.0)	27.0 (7.1)
Personal counseling or therapy	18.8 (2.9)	15.3 (3.9)	26.6 (8.0)	5.9 (3.9)	25.4 (5.3)	19.4 (6.4)	37.6 (7.7)
Number of accommodations:							
None	36.0 (3.6)	33.2 (5.2)	48.3 (9.2)	60.5 (8.2)	32.3 (5.7)	32.9 (7.7)	56.8 (8.0)
One	14.6 (2.6)	17.1 (4.1)	14.3 (6.5)	10.4 (5.1)	7.9 (3.3)	21.3 (6.7)	8.9 (4.6)
Two	16.6 (2.8)	16.6 (4.1)	13.2 (6.5)	14.2 (5.9)	20.6 (4.9)	6.2 (3.9)	9.1 (4.6)
Three	11.4 (2.4)	12.1 (3.6)	11.3 (5.8)	7.6 (4.5)	10.8 (3.8)	11.2 (5.2)	7.6 (4.3)
Four or more	21.3 (3.1)	21.0 (4.4)	12.9 (6.1)	7.4 (4.5)	28.4 (5.5)	28.2 (7.5)	16.8 (5.4)
n	656	161	71	93	140	91	100

Standard errors are in parentheses.

Source: Survey of Students' Secondary School Programs.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

Support Offered Regular Education Teachers

We also consider two variables related to support provided to regular education teachers who had mainstreamed students in their classes. A dichotomous variable indicates whether the teacher was provided assistance that increases the adult/student ratio or increases the opportunity for individual attention for students (i.e., an aide in the classroom, smaller class size, peer tutors for students). A second variable indicates the number of the following other forms of assistance a teacher might receive: consultation from a special educator, special materials for special education students, special procedures to use in teaching special education students, or in-service training on the needs of special education students.* We expect students to have greater connection to schooling, as indicated by lower absenteeism and a lower probability of dropping out, and a lower likelihood of course failure if the teacher

* On this summative measure, a value of zero was assigned to both students whose regular education teachers had none of these forms of support and students who had no regular education classes. A dichotomous variable is included in this model to distinguish students who had no regular education classes.

and/or student receives these kinds of support; support to the student is expected to have the stronger relationship.

Table 4-8 indicates the degree to which students with disabilities had regular education teachers who received these forms of support. Overall, only 11% of 12th-graders with disabilities had regular education teachers who received help that would reduce the teacher/student ratio because a special education student was in the class. Other forms of support were more common, with only 28% of students having regular education teachers who received none of the nonhuman forms of support we investigated. Students with physical, health, or multiple impairments were among the least likely to have regular education teachers who received support (7% received human support and 39% received nonhuman support). In contrast, students with sensory impairments were most likely to have regular education teachers who received human supports (16%), and students with learning disabilities were most likely to have regular education teachers who received nonhuman supports (78%).

Table 4-8

SUPPORTS PROVIDED TO REGULAR EDUCATION TEACHERS WITH MAINSTREAMED STUDENTS, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Sensory Impaired	Other
Percentage whose regular education teachers received:							
Classroom aide, reduced class size, or other reduction in teacher/student ratio	10.9 (2.3)	11.2 (3.5)	6.4 (4.5)	8.5 (4.7)	12.4 (4.0)	15.8 (6.0)	7.2 (4.2)
Number of nonhuman supports:							
None	28.2 (3.4)	21.9 (4.5)	38.4 (9.0)	39.8 (8.2)	34.5 (5.8)	41.2 (8.0)	61.3 (7.9)
One	42.8 (4.5)	49.3 (6.1)	40.9 (9.1)	49.2 (8.5)	27.9 (5.5)	22.8 (6.7)	20.3 (6.5)
Two	15.0 (2.7)	15.4 (4.0)	6.1 (4.4)	7.8 (4.5)	18.8 (4.8)	18.8 (6.4)	11.3 (5.1)
Three or more	14.1 (2.6)	13.5 (3.8)	14.6 (6.5)	20.7 (6.4)	11.0 (4.0)	17.2 (6.3)	7.2 (4.9)
n	701	178	75	106	138	98	106

Standard errors are in parentheses.

Source: Survey of Students' Secondary School Programs

* "All conditions includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

School Characteristics

Finally, we consider the relationships between students' school performance and four aspects of their schools, discussed below. Although we hypothesize particular directions of relationship between these factors and student performance, we expect that, because these factors are less immediate in the experience of students, these relationships will be weaker than those between performance and individual characteristics of students or their programs.

School size. Other research has suggested that larger schools engender less affiliation on the part of students (Wehlage, 1983; U.S. General Accounting Office, 1987; Pittman and Haughwout, 1987), which results in poorer student performance and higher dropout rates in the general student population (Kaufman and Bradby, 1992). Earlier NLTS analyses (Wagner, 1991) demonstrated a similar relationship for students with disabilities as regards the likelihood of course failure. We expect this relationship to be maintained in current analyses for students with disabilities.

Table 4-9 depicts the size distribution of schools attended by students with disabilities. Schools averaged 1,003 students, with students with sensory or physical impairments attending larger schools, on average, than other students. For example, students classified as deaf or hard of hearing attended schools that averaged 1,432 students, compared with 1,100 students in the schools attended by youth with serious emotional disturbances ($p<.001$).

Low-income student body. The common finding of poor school performance for students in poverty often confounds the poverty of students with the poverty of their schools; low-income students often attend schools that have a large proportion of those students. Such schools often are resource-poor themselves, with less diversity of programs, lower-paid teachers, and poorer quality and lower quantity of materials, which in turn may contribute to weaker student affiliation and poorer student performance in those schools (Fine, 1987).

To disentangle the relationships of individual student poverty and attendance at low-income schools for students with disabilities, we have included in the analysis a 4-category measure of the proportion of the student body that qualifies for free or reduced-price lunches or AFDC (less than 10%, 10% to 25%, 26% to 50%, more than 50%). Table 4-9 shows that about 1 in 5 students with disabilities attended schools with fewer than 10% of the student bodies coming from low-income households, whereas 15% atttended schools where more than half the students were from poor households. Students with speech impairments were the most likely to come from high-poverty schools. More than 1 in 4 did so (26%), compared with 14% of students with learning disabilities, for example ($p<.001$). Contrary to expectations that high-poverty schools would be large urban schools, schools with higher concentrations of poor students were significantly smaller. The average enrollment in schools with fewer than 10% of students in poverty was 1,149, compared with an average of 871 students in schools where more than half the student body was poor ($p< 001$).

Table 4-9

STUDENT ENROLLMENT CHARACTERISTICS OF REGULAR SECONDARY SCHOOLS ATTENDED BY STUDENTS WITH DISABILITIES, BY DISABILITY CATEGORY

	All Conditions*	Learning Disabled	Emotionally Disturbed	Speech Impaired	Mentally Retarded	Visually Impaired	Hard of Hearing	Deaf	Orthopedically Impaired	Other Health Impaired	Multiply Handicapped
Percentage of students attending schools with enrollment of:											
Less than 300	11.6	14.1	7.6	4.2	9.1	4.2	3.9	3.7	3.0	3.6	8.2
	(1.0)	(1.5)	(1.7)	(1.3)	(1.4)	(1.4)	(1.1)	(1.6)	(1.1)	(1.5)	(2.7)
300 to 899	39.9	39.1	34.8	31.8	50.2	19.8	21.3	12.9	17.2	18.8	34.4
	(1.5)	(2.2)	(3.0)	(3.1)	(2.4)	(2.8)	(2.4)	(2.9)	(2.4)	(3.0)	(4.7)
900 to 1,499	26.7	26.1	31.5	31.8	24.6	33.9	34.1	41.2	33.8	20.9	29.2
	(1.3)	(2.0)	(2.9)	(3.1)	(2.1)	(3.4)	(2.8)	(4.2)	(3.0)	(3.2)	(4.5)
1,500 or more	21.8	20.7	26.1	32.2	16.2	42.1	40.7	42.2	45.9	56.8	28.3
	(1.2)	(1.8)	(2.7)	(3.1)	(1.8)	(3.5)	(2.9)	(4.2)	(3.1)	(3.9)	(4.5)
Average enrollment	1,003	979	1,100	1,222	894	1,483	1,432	1,432	1,470	1,625	1,108
	(19.9)	(29.9)	(38.2)	(46.0)	(28.8)	(68.2)	(44.7)	(52.4)	(45.7)	(62.2)	(65.0)
n	4,385	846	438	379	717	340	513	235	447	281	181
Percentage of students attending schools with proportion of minority students:											
Less than 10%	19.7	20.5	28.5	20.6	13.1	20.4	19.0	28.3	19.0	19.6	21.0
	(2.3)	(2.8)	(2.8)	(2.7)	(1.6)	(2.9)	(2.3)	(3.9)	(2.5)	(3.1)	(4.0)
10% to 25%	36.9	38.3	29.5	33.4	32.6	39.5	37.8	32.1	43.8	28.2	33.6
	(1.4)	(2.2)	(3.0)	(3.2)	(2.3)	(3.5)	(2.9)	(4.0)	(3.1)	(3.6)	(4.7)
26% to 50%	28.2	27.5	21.3	19.7	35.5	23.5	24.9	26.9	21.0	27.1	24.1
	(1.3)	(2.0)	(2.5)	(2.7)	(2.3)	(3.1)	(2.5)	(3.8)	(2.5)	(3.5)	(4.2)
More than 50%	15.2	13.7	10.7	26.3	18.7	16.6	18.4	12.8	16.2	25.1	21.3
	(1.1)	(1.5)	(1.9)	(3.0)	(1.9)	(2.7)	(2.3)	(2.9)	(2.3)	(3.4)	(4.1)
n	4,340	840	436	375	719	330	500	232	444	273	183

Standard errors are in parentheses.

* "All conditions" includes youth in each of the 11 federal special education disability categories. Percentages are reported separately only for categories with at least 25 students.

We expect this variable to have an independent relationship to higher absenteeism and rates of course failure and dropping out, beyond the relationship of performance to the individual student's household income. Research on students in the general population has demonstrated the independent detrimental effects that poor schools have on student performance, even when controlling for the socioeconomic status and minority background of students (Kaufman and Bradby, 1992).

Leadership of the principal. School reform literature has supported the importance of the principal in providing leadership for school improvement (Goodlad, 1984). Schools with strong principals who are devoted to increasing the effectiveness of their schools are environments in which students are more likely also to be committed to the schools and to succeed academically. To measure the leadership of principals, teachers of students with disabilities in the supplemental sample were asked to express their level of agreement with the following statements:

- The principal and teachers work as a team to establish the school's goals and procedures.
- Classroom instruction is regularly supervised.
- The principal promotes instructional improvement among school staff.

Responses to each item ranged from "strongly agree" to "strongly disagree." A 6-point scale was created from these responses, with a higher value indicating greater agreement with the positive statements about the principal's leadership (for variable construction refer to Valdés, 1993). Table 4-10 indicates the distribution of the scale; there were no significant differences in distributions for students in different disability categories or for schools of different sizes or low-income populations. We expect lower absenteeism and rates of course failure and dropping out for students in schools in which the teacher reports that the principal is a strong leader.

Table 4-10

TEACHERS' REPORTS OF SCHOOL CLIMATE AND LEADERSHIP IN SECONDARY SCHOOLS ATTENDED BY STUDENTS WITH DISABILITIES

School Climate	Percentage	Standard Error
Students whose teachers' level of agreement with statements about positive principal leadership was:		
Disagree	9.6	2.2
Slightly disagree	13.9	2.6
Somewhat agree	32.9	3.5
Agree	17.6	2.8
Mostly agree	12.1	2.4
Strongly agree	13.9	2.6
Students whose teachers' level of agreement with statements about positive school climate was:		
Disagree	18.0	2.9
Agree	17.9	2.8
Mostly agree	42.4	3.7
Strongly agree	21.7	3.1
n	712	

School climate. Although there is little consensus regarding measures of school climate, there is agreement in the school reform literature that some schools have environments that are more conducive to learning than others and that such environments support students in their engagement in schooling and their performance in their courses. Kaufman and Bradby (1992) have found, for example, that students who attend schools where security issues are not particularly salient are 21% less likely to perform below basic reading levels and half as likely to drop out as students attending schools where security concerns are perceived to interfere with learning (controlling for student differences in gender, ethnic background, and socioeconomic status).

To assess the climate of the schools attended by our supplemental sample of students with disabilities, one teacher for each student was asked to report his/her level of agreement with a variety of statements about the school. Responses to the following two statements were highly related:

- Standards for classroom behavior are systematically enforced.
- The school climate is conducive to learning.

Responses to each item ranged from 1 (least positive view of the aspect of the school) to 4 (most positive view of the aspect of the school). A 4-category scale was formed from the two individual items, with higher values indicating greater agreement with statements about positive school climate (for variable construction refer to Valdés, 1993).

Table 4-10 indicates the percentages of students with disabilities who attended schools characterized by these categories of agreement with items related to a positive school climate. We expect lower absenteeism and rates of course failure and dropping out for students who attended schools with higher teacher evaluations of school climate.

This chapter has suggested the considerable complexities in the relationships implied in the NLTS conceptual framework, complexities that we attempt to disentangle analytically in the next chapter.

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5 WHAT MAKES A DIFFERENCE?

The preceding chapter described in detail our conceptual approach to considering the complexity of the performance of students with disabilities in secondary school. This approach and other ongoing work of the special education research community illustrate that a large number of factors must be considered if we are to understand difficult issues, such as course failure. This consensus implies that a multivariate approach to data analysis is needed. This chapter presents results of our efforts to test the hypotheses described in Chapter 4 through multivariate analyses.

We begin with a discussion of the similarities and differences between the current analyses and previous NLTS multivariate analyses of school performance (Wagner, 1991), as a context for interpreting current findings. This is followed by an explanation of the role in the analysis of the extended analytical model that allows for the consideration of student behavior and school climate variables that could not be included in the main grade-level analyses. We then discuss the relative explanatory power of the set of independent variables in explaining variation in three dependent variables: days absent in the school year, whether a failing grade was received in the school year, and whether the student had dropped out of school during or before that school year. Finally, we describe the results in terms of the structure provided by Chapter 4, presenting relationships to the dependent variables of disability factors, demographics, household characteristics, student behaviors, school program factors, and school characteristics.*

Current vs. Previous NLTS Multivariate Analyses

Previous NLTS reports also presented findings of multivariate analyses regarding school performance (Wagner, 1991; Wagner et al., 1991). The analyses reported here replicate previous work in some respects, by focusing on a similar set of dependent variables and analyzing their relationships to some of the same independent variables. However, there are some important differences between the two sets of analyses that result in different findings in some instances. First, earlier analyses were based on data for a single school year for each student. The current analyses take advantage of school transcripts that allow a more complete picture of students' school programs. For example, we can now assess whether an independent variable has more influence on performance in 9th grade or in 12th grade. This difference in time frames between previous and current models, as well as the exclusion of

* Throughout this chapter, we refer to the effects of individual factors assuming that all other factors in the model are held constant. Thus, these multivariate findings sometimes differ in magnitude from those from the bivariate analyses in Chapter 3.

special-school students from the current analyses, result in some differences in findings generated by the two sets of analyses. We alert the reader when the two analyses produce apparently discrepant findings and offer possible explanations for the differences.

Grade-Level Models vs. the Extended Models

The main focus of the analysis is on grade-level multivariate models that allow a longitudinal look at the performance of students with disabilities in secondary schools using data from student transcripts. However, transcripts are limited in that they contain little information concerning youth behavior, the climate of the school, or the nature of supports offered to students and teachers. These issues are addressed in extended models that include data from the NLTS student school program survey, completed by teachers of a subset of students (see Chapter 2 for more details). However, these survey data are available primarily for 12th-graders; only a small number of 11th-graders were included in the subset of students. Thus, the students included in the extended models had remained in school at least through 11th grade and may have been a different, and possibly more successful, group than those who dropped out of school before 11th or 12th grade. Therefore, findings from the extended models generalize only to that subset of students. Further, analyses of dropout behavior were not performed with the extended models because all students had persisted in school through at least 11th grade.

In testing the extended model, we began with the original set of variables from the grade-level models to establish that the subset of students with school program survey data was similar to the larger group for that set of independent variables. (The coefficients are supplied in Appendix A.) We conducted a separate analysis for each factor added from the school program survey.

Relative Explanatory Power of Multivariate Models

As with other NLTS multivariate analyses, multiple regression was used to estimate models that involved a continuous dependent variable (i.e., absences) and logistic regression was used when dichotomous dependent variables were involved (i.e., course failure, dropout). We evaluated the relative fit to the data of the three sets of models via the customary adjusted r^2 statistic for multiple regression models and the pseudo r^2 statistic for the logistic regression models. The pseudo r^2 statistic is not directly comparable to the familiar r^2 in multiple regression and does not adjust the estimate for the number of independent variables included in the model. However, it ranges from 0 to 1 and does provide a general indicator of the overall power of the predictor variables in explaining the dependent variables (Aldrich and Nelson, 1984).

Table 5-1 demonstrates that the independent variables of individual, household, behavior, school program, and school characteristics predict absences, course failure, and dropout equally well in the 9th grade (r^2 or Pseudo r^2 = .11 to .15). For successive years of high school, the independent variables predict student absences better than either course failure or dropout. In 12th grade, for example, the absence model yielded an r^2 of .45, compared with pseudo r^2 values of .13 and .22 for failure and dropout respectively. The relationships among the grade-level models within an outcome area also differed from one another. The course failure models exhibited similar predictive capacity across all four grade levels (pseudo r^2 from .13 to .19). In contrast, the predictor variables for the absence and dropout models increased in their power with each successive grade level: r^2 values for absence models increased from .11 to .45, and the pseudo r^2 values for the dropout models increased from .11 to .22.

The extended models exhibited a fit to the data that was comparable to those of the 12th-grade models. For example, the extended absence models yielded r^2 values ranging from .38 to .41. The extended models regarding course failure yielded pseudo r^2 values from .18 to .20.

Table 5-1

RELATIVE FIT OF MULTIVARIATE MODELS

	Dependent Variable		
	Absenteeism (r^2)	Course Failure (Pseudo r^2)	Drop Out (Pseudo r^2)
9th grade	.11	.15	.11
10th grade	.36	.19	.10
11th grade	.39	.17	.15
12th grade	.45	.13	.22
Extended model	.38 to .41	.18 to .20	NA

Disability-Related Factors

Earlier NLTS multivariate analyses found individual characteristics such as disability to be strong predictors of a host of educational outcomes. The current results support our earlier findings.

Primary Disability Category

The role of disability category in these multivariate analyses was primarily one of statistical control. However, the results illustrate the importance of disability category in the experiences of youth with disabilities. Overall, disability category was more strongly related to variations in absenteeism and course failure than dropping out (see Table 5-2).

The effects of disability differences are depicted in Table 5-2 by comparing students in each category with students classified as learning disabled, controlling for other differences between them. The negative signs that predominate illustrate the difficulties with school performance that students with learning disabilities had; most other categories of students had lower absenteeism and course failure and, to a lesser degree, a lower probability of dropping out. In particular, students with sensory disabilities experienced significantly better outcomes than their peers with learning disabilities across the grade levels. Deaf students and those with visual impairments, for example, were estimated to miss significantly fewer days of school (2 to 4 days, at least $p<.05$) and be less likely to fail a class (7 to 20 percentage points, $p<.01$) than their peers with learning disabilities.

In contrast to the better performance of most students relative to those with learning disabilities, students with serious emotional disturbances were estimated to be absent more often and to be both more likely to fail a class and to drop out than peers with learning disabilities, independent of other differences between them. The largest differences between the two groups of students regarding absences and failure were in 9th grade (4 days and 11 percentage points, $p<.01$ and $p<.10$), with declining differences in subsequent years. However, an analysis of dropping out showed exactly the opposite trend; the difference between youth with emotional disturbances and learning disabilities was greatest in 12th grade (11 percentage points, $p<.01$). This is consistent with our hypothesis that accumulated school failure leads to disengagement and ultimately to dropping out of school.

Self-Care and Functional Mental Skills

We hypothesized that students with low self-care skills would be absent more than those with higher self-care skills. Our current analyses confirm these findings only in 9th grade (Table 5-2), when students with high self-care abilities were estimated to be absent 3 fewer days than peers with medium self-care scale scores, other factors being controlled for ($p<.01$). Students with higher self-care scale scores were somewhat more likely to fail courses, but significantly so only in 9th grade (8 percentage points; $p<.05$). Consistent with our hypotheses, students with higher self-care abilities were more likely to leave school without completing than others, who often were those with more severe disabilities who tended to stay in school until they aged out. Further, self-care skills appeared to be an increasingly important predictor of dropping out across the four grade levels.

Table 5-2

ESTIMATED CHANGE IN SCHOOL PERFORMANCE ASSOCIATED WITH DISABILITY-RELATED CHARACTERISTICS, BY GRADE LEVEL

	Estimated Change in:												
	Absences (Average Number of Days Absent)				Course Failure (Percentage Points)				Dropout (Percentage Points)				
	9	10	11	12	9	10	11	12	9	10	11	12	For Increment
Disability category													
Emotionally disturbed	4.0**	1.9	1.4	.1	11.0†	4.5	4.4	3.0	2.2	3.3	7.8*	11.0**	Emotionally disturbed vs. learning disabled
Speech impaired	-1.3	-3.1†	-1.2	-1.6	-11.0†	-9.8	-17.0**	-10.0	.2	3.1	1.5	-.6	Speech impaired vs. learning disabled
Mentally retarded	.9	-.1	-0.6	-.8	-6.0	-.4	-6.1	-6.5	1.8	1.4	3.2	1.1	Mentally retarded vs. learning disabled
Deaf	-3.8**	-3.4**	-2.9*	-2.4*	-14.0**	-12.0*	-14.0**	-15.2**	-1.5	-1.0	-3.2	-5.5	Deaf vs. learning disabled
Hard of hearing	-1.6	-2.2†	-3.1**	-2.1†	-13.0**	-8.7†	-12.0**	-9.5†	-.4	-1.0	-1.2	-5.5†	Hard of hearing vs. learning disabled
Visually impaired	-3.3*	-2.6*	-2.6*	-2.4*	17.0***	-20.0***	-18.0***	-7.1	.4	2.7	.5	-5.0	Visually impaired vs. learning disabled
Orthopedically impaired	-.3	.5	-2.5	-2.8†	-14.0*	-17.0**	-15.0**	-12.5†	-3.8	0	-.9	-7.8*	Orthopedically impaired vs learning disabled
Other health impaired	5.5**	4.1*	-3.3*	-3.3*	-8.0	-1.4	-15.0**	-7.5	3.1	.5	-.9	-4.8	Other health impaired vs learning disabled
Multiply handicapped	.9	-2.0	-2.5	-4.7**	-7.0	.6	-15.0*	-13.7†	-1.1	-1.5	3.5	-3.9	Multiply handicapped vs learning disabled
Functional skills													
Functional mental skills scale score	1.4*	-.1	.3	-.4	7.0*	3.7	4.9	1.4	-1.5†	0	0.4	-1.9	High (16) vs. medium (12)
Self-care ability score	-2.8**	-.3	.0	-.4	8.0*	7.1	.9	7.1	1.1†	2.1†	3.1†	5.9	High (11) vs. medium (8)

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

In contrast to expectations of higher performance for students with higher functional mental skills, students with higher skills were estimated to be significantly more likely to fail a class in 9th grade than peers with lower abilities (7 percentage points comparing students with high and medium scale scores, $p<.05$). After 9th grade, the effects of functional mental abilities on course failure diminished, as was true for self-care skills. It is plausible that variability attributed to functional skills in 9th grade was absorbed by measures of previous student course failure and absenteeism. Functional mental skills also were associated with a lower probability of dropping out in 9th grade, in contrast to the lack of relationship to dropping out found in earlier NLTS analyses.

Tested Grade Levels for Reading and Mathematics

Descriptive analyses in Chapter 3 suggested that the reading and mathematics abilities of students with disabilities averaged 3 years behind grade level. The extended model suggests that these skills had a complex relationship with other outcomes (Table 5-3). Neither reading nor mathematics level was significantly related to absenteeism, independent of other factors, suggesting that students' engagement in school may be independent of their school abilities. However, students whose reading abilities were at the appropriate grade level were 7 percentage points less likely to fail a class than peers who were 3 years behind their current grade level ($p<.05$). On the other hand, youth who scored at grade level in mathematics were not significantly more likely to fail a class than classmates who were 3 years behind. The stronger relationship of reading ability to performance, relative to mathematics ability, may reflect the pervasiveness of the demands placed on students' reading skills in most classes; math skills are used in relatively fewer high school courses.

Table 5-3

ESTIMATED CHANGE IN ABSENCES AND COURSE FAILURE ASSOCIATED WITH READING AND MATHEMATICS LEVELS

	Average Number of Days Absent	Percentage Failing Courses	For Increment
Years behind in reading	.3	-6.9*	At grade level vs. 3 years behind
Years behind in math	-1.0	5.9	At grade level vs. 3 years behind

* $p<.05$

Estimates based on an extended model using a subset of 11th- and 12th-grade students (n=368) who had data from the Survey of Secondary School Programs.

Individual Demographic Characteristics

Gender. The grade-level analyses indicate that the relationship of gender to performance is complicated and changes over the course of secondary school. Gender was unrelated to absenteeism at any grade level, consistent with expectations. It was related both to course failure and to dropping out at some grade levels (Table 5-4). Males were estimated to be more likely to fail classes than their female peers, but only in 9th grade (6 percentage points, $p<.05$). The importance of gender to course failure decreased over time and was lowest in 12th grade. Controlling for other factors, we observe the opposite trend regarding gender and dropping out. Whereas there was no relationship in 9th grade, males were estimated to drop out considerably more than female peers in 11th and 12th grades (4 and 7 percentage points; $p<.05$ and $p<.10$).

Ethnic background. As expected, ethnic background was found to relate to some outcomes but not to others, when other factors were controlled (Table 5-4). Grade-level analyses confirm that being Hispanic did not relate to absenteeism or to dropping out at any grade level. Controlling for other factors, African American youth differed from white peers by no more than 1.5 days absent ($p<.10$) in 12th grade and were no more likely to drop out in any year. In the case of dropping out, our estimated change in the probability is nearly identical to the results of earlier analyses that suggested that minority status was associated with a lower probability of dropping out. The grade-level models confirm that the effects were small and inconsistent in direction across grade levels.

On the other hand, ethnic group membership was an important factor in the probability of failing a class in 9th through 11th grades. African American students were estimated to be more likely than white peers to fail a class in 9th (8 percentage points; $p<.05$), 10th (8 percentage points; $p<.10$), and 11th grades (11 percentage points; $p<.01$), whereas the estimated failure rates of Hispanic youth exceeded those of whites in 9th (16 percentage points; $p<.01$) and 11th grades (14 percentage points; $p<.05$). At variance with much of the literature on school dropout, our findings suggest that if there is a relationship between ethnic background and dropping out, it is an indirect relationship via failing courses.

Table 5-4

ESTIMATED CHANGE IN SCHOOL PERFORMANCE ASSOCIATED WITH DEMOGRAPHIC AND HOUSEHOLD CHARACTERISTICS, BY GRADE LEVEL

	Estimated Change in:												
	Average Number of Days Absent				Percentage Failing Courses				Percentage Dropping Out				
	9	10	11	12	9	10	11	12	9	10	11	12	For Increment
Demographic characteristics													
Youth was male	.6	-.9	-.1	-.6	6.0*	7.6	4.5	1.4	.1	1.9	4.1*	7.1†	Yes vs. no
Youth was African American	1.0	-.1	.4	1.5†	8.0*	7.9†	11.0**	2.6	-.8	-1.1	.5	-2.5	African American vs. white
Youth was Hispanic	-1.6	-1.4	.7	.8	16.0**	-3.7	14.0*	1.6	-2.2	3.0	2.2	1.3	Hispanic vs. white
Household characteristics													
Student was from a single-parent household	-1.1	-2.1*	-1.7*	-.3	-1.0	7.7	-10.9	-5.4	-1.0	-.0	1.7	3.7	Yes vs. no
Household income (5 category scale)	-1.8**	.5	-.8	-.1	-4.0	-.7	1.1	3.1	-2.6*	-1.6	-2.7†	-1.8†	$38,000 to $50,000 vs. <$12,000

† p < .10, * p < .05, ** p < .01, *** p < .001

Household Characteristics

Household income. Chapter 3 showed a fairly consistent pattern of bivariate relationships of income to performance, but multivariate relationships are less consistent (Table 5-4). The effects of poverty on absenteeism are in the expected direction, but statistically significant only for 9th grade. There is no significant relationship to course failure at any grade level. These results contradict earlier NLTS findings that students from higher-income households had lower absenteeism and a lower probability of failing a class when a single school year was considered. It may be that the direct measures of previous secondary school performance that are used in current grade-level analyses absorb the effects of household income in analyses of 10th through 12th grades. The relationship of poverty to dropping out was consistent (1 to 3 percentage points), and significant in 9th, 11th, and 12th grades, also in contrast to earlier NLTS findings in which no relationship to dropping out was found, independent of other factors. The relationship between income and dropping out may be clarified in the current analyses by the elimination of special-school students, who tended to be poorer but to drop out less than regular-school students. Their inclusion in earlier analyses may have masked the negative relationship revealed in current analyses.

Two-parent household. Current analyses confirm that youth from two-parent families were estimated to miss fewer days of school (Table 5-4). The differences, however, were not large in terms of days missed and were statistically significant only for the 10th and 11th grades (2 days; $p<.05$). None of the coefficients in the failure or dropout models was statistically significant.

Parental support for their children's education. Confirming expectations, in the extended model of student performance, parental involvement in a student's education is powerfully related to student performance (Table 5-5). Controlling for all other factors, students whose teachers indicated that their parents were very involved in their education missed 5 fewer days of school ($p<.05$) and were 25 percentage points less likely to fail a class ($p<.001$) than their peers whose parents were not at all involved. This finding supports the current federal initiatives to increase parental participation in both IEP and ITP planning activities as a way of improving outcomes for youth with disabilities.

Table 5-5

ESTIMATED CHANGE IN ABSENCES AND FAILURE ASSOCIATED WITH PARENTAL INVOLVEMENT

	Average Number of Days Absent	Percentage Failing Classes	For Increment
Level of parental involvement in student's secondary school experiences	-4.9*	-25.0***	Very involved vs. not at all involved

* p< 05; *** p<.001.

Estimates based on an extended model using a subset of 11th- and 12th-grade students (n=368) who had data from the Survey of Secondary School Programs.

Student Behaviors

Social behaviors. Current analyses offer strong support for the hypotheses that belonging to a school or community group and that seeing friends frequently outside of school are related to educational outcomes, and that these two factors operate in opposite directions, representing competing aspects of students' engagement in school (Table 5-6). Group membership was strongly and consistently associated with lower absenteeism and lower probabilities of course failure and dropping out. For example, in 12th grade, group members were estimated to miss 2 fewer days than nonmembers (p<.001) and to have a lower probability of failure (9 percentage points, p<.05) and dropout (10 percentage points, p<.01). On the other hand, youth who were very active socially outside of school (seeing friends 4 to 5 times a week) were estimated to be absent more than peers who saw friends less frequently (e.g., in 12th grade, 2 days, p<.05). These socially active students also were significantly more likely to drop out of school in 12th grade (7 percentage points, p<.05). Interestingly, the impact on school dropout of both of these factors was strongest in the 12th grade. These results offer further support for the notion that group membership indicates engagement in school, while a substantial degree of social activity indicates the possible impact of competing forces outside of school.

Table 5-6

ESTIMATED CHANGE IN SCHOOL PERFORMANCE ASSOCIATED WITH STUDENT BEHAVIORS, BY GRADE LEVEL

	Estimated Change in:												
	Average Number of Days Absent				Percentage Failing Courses				Percentage Dropping Out				
	9	10	11	12	9	10	11	12	9	10	11	12	For Increment
Student behaviors													
Student belonged to a school/community group	-4.2***	-2.9***	-2.0**	-2.4***	-10.0***	-6.8*	-8.2**	-9.3*	-2.7*	-3.8**	-7.7**	-10.5**	Yes vs. no
Frequency of seeing friends	2.7**	2.1*	1.3	2.2**	1.1	3.7	1.9	3.1	1.1	.9	2.2	6.6*	4 or 5 days/week vs. once/week
Prior school performance													
Student was older than typical age for grade	1.8*	--	--	--	9.0***	--	--	--	8.0***	--	--	--	Yes vs. no
Average absenteeism	--	7.0***	8.1***	8.3***	-1.0	8.5***	5.9**	4.3*	.8***	1.5***	2.6***	6.9***	18 vs. 8 days
Student ever failed a class	--	4	1.1	1.3*	2.0	35.0***	25.0***	35.0**	4.2**	3.8*	12.0***	15.0***	Yes vs. no

* $p < .05$, ** $p < .01$, *** $p < .001$

Prior school performance. The cumulative nature of youths' experiences, as well as their impact on outcomes, has been an ongoing focus of the NLTS. As was the case in earlier NLTS analyses, students who were older than expected for their grade level had less positive school performance on all three dependent measures. In 9th grade, older youth were absent more often (2 days, $p<.05$), more likely to fail (9 percentage points, $p<.001$), and to drop out (8 percentage points, $p<.01$) than peers who were the typical age for their grade level. The importance of this variable in 9th grade suggests that it is a proxy for earlier grade retention. In addition, older youth may have become disenchanted as they observed age peers progressing and succeeding while they did not, supporting the notion that accumulated experiences were powerful forces in youths' present experience.

The grade-level analyses further illustrate the cumulative nature of school success or failure. Absenteeism or course failure in a previous grade level was among the strongest predictors of absenteeism or failure at subsequent grade levels.

As one would expect, given the high correlations among performance measures (see Chapter 3), previous performance in one area is related to performance in other areas. High absenteeism was strongly related to the probability of course failure and to dropping out, and course failure was similarly related to dropping out, independent of absenteeism. For example, youth who missed 18 days of school were significantly more likely to fail classes in 10th through 12th grades (4 to 8 percentage points, $p<.001$ and $p<.01$). Furthermore, both previous absenteeism and course failure were very powerful predictors of school dropout at each grade level. By 12th grade, students whose average absenteeism had been 18 days annually were 7 percentage points more likely to drop out than peers who averaged 8 days absent per year ($p<.001$). Similarly, students who had failed a course at some point during high school were 15 percentage points more likely to drop out by 12th grade than peers who had not ($p<.001$). Interestingly, both of these variables increased in their power to predict dropping out with successive grade levels. This pattern supports the hypothesis that prior performance can have the effects of loosening social bonds between youth and their schools as they progress through high school.

In-class behavior. Two student behavior scales based on teacher ratings were included in the extended models of student performance: the behavioral norm scale (i.e., getting along with others, following directions, and controlling behavior), and the task performance scale (i.e., completing homework assignments, taking part in group discussion, and staying focused on work). We hypothesized that both measures would be related to performance, inasmuch as they represented different aspects of students' engagement in school. In Table 5-7, both measures were similar in their relationship to performance: students whose behaviors were rated more positively by their teachers had better outcomes. However, only the task performance scale was significantly related to school performance. Students who were rated highly were estimated to miss 4 fewer days of school ($p<.01$) and to be 29 percentage points less likely to fail a class than peers who were not ($p<.001$). This finding suggests that school efforts aimed at supporting students in performing their school-related tasks are more likely to

have a direct impact on performance than those that focus on social skills, which have a different agenda. Nonetheless, programs emphasizing school survival skills (see, for example, Zigmond, 1991) seem likely to have an impact on course failure.

Table 5-7

ESTIMATED CHANGE IN ABSENCES AND COURSE FAILURE ASSOCIATED WITH IN-CLASS BEHAVIORS

	Average Number of Days Absent	Percentage Failing Classes	For Increment
Teacher rating of youth compliance with in-class behavioral norms	-3.2	-1.4	High vs. low
Teacher rating of youth performance on academic task-related behaviors	-4.4**	-29.3***	High vs. low

** p< .01; *** p< .001.

Estimates based on an extended model using a subset of 11th and 12th grade students (n=368) who had teacher survey data.

Students' School Programs

Academic course-taking. Previous NLTS analyses considered the relationship of course-taking and performance in terms of the overall percentage of time students spent in regular education. Those results suggested that students who spent more time in regular education were more likely to fail a class than those who spent less time there, controlling for other differences between students. Our current analyses redefine course-taking in terms of the amount of time spent in academic classes in regular education settings. Despite this change in variables, the present grade-level analyses confirm previous results (Table 5-8).

Students who spent most of their time in regular education academic classes were estimated to be 10 percentage points more likely to fail a class in 9th grade than peers who spent just half of their time there. Interestingly, this effect is strongest in 9th grade and decreases with each successive grade level. This trend may be due to youth who dropped out early in high school or to increased participation in vocational education in the later years.

Table 5-8

ESTIMATED CHANGE IN SCHOOL PERFORMANCE ASSOCIATED WITH SCHOOL PROGRAMS AND SCHOOL CHARACTERISTICS, BY GRADE LEVEL

	Estimated Change in:												
	Average Number of Days Absent				Percentage Failing Courses				Percentage Dropping Out				
	9	10	11	12	9	10	11	12	9	10	11	12	For Increment
School programs													
Percentage of time in regular education academic classes	-.5*	.1	.0	.7**	10.0**	3.7***	3.1**	1.9	.2	.0	.2	.0	6 vs. 3 classes
Hours in occupational vocational education	-.4	-.2	--	--	-4.0***	-.1	--	--	.5	-1.3	--	--	5 hours per week vs. none
Took occupational vocational class in a previous grade	--	.8	--	--	--	1.4	--	--	--	-.7	--	--	Yes vs. no
Concentrated in one or more occupational vocational content areas	--	--	-.3	1.4	--	--	12.0†	12.3	--	--	-6.4***	-17***	Yes vs. no
Took survey vocational courses	--	--	-.6	1.5	--	--	3.8	8.7	--	--	-13.0***	-19.0***	Yes vs. no
Participated in a work experience program	--	--	-3.1*	-1.1	--	--	-16.0**	1.7	--	--	-3.3	-7.2**	Yes vs. no
School characteristics													
Student enrollment	.5†	.2	.5†	.4	12.0**	5.4***	3.6**	3.0*	.4	-.3	.3	.0	1,300 vs. 700 students
Proportion of school population living in poverty	1.3	2.8***	1.3	2.3*	2.0+	5.7†	2.2	3.0	.6	.7	1.0	1.6	Less than 10% vs. 26% to 50%

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Alternatively, the relationship between course-taking and course failure in later years may become less direct, operating through its effects on earlier course failure.

The relationship of taking academic regular education classes to absenteeism is complex. The relationships are small overall, but statistically significant and in opposite directions in 9th and 12th grades. Taking academic regular education classes was not related to dropping out, independent of other factors.

Vocational course-taking. Current analyses only partly confirm the hypothesis that vocational instruction, as an alternative to academic curricula, ameliorates course failure and assists in dropout prevention. The analyses also illustrate the complexity of students' secondary school experiences (Table 5-8). First, time spent in occupational vocational education had little effect on performance in either 9th or 10th grade. Nor did beginning occupational training in 9th rather than 10th grade have an effect on 10th-grade performance. Dichotomous variables for taking survey vocational classes and concentrating in vocational education also were not associated with absenteeism or course failure when they were introduced in the 10th- and 11th-grade analyses. However, taking a concentration in vocational education and taking survey vocational education classes both were associated with dramatically lower probabilities of dropping out in 11th and 12th grades, compared with students who took no vocational instruction or prevocational instruction only (from 6 to 19 percentage points, $p<.001$).

Interpreting this finding is not straightforward, however. Logically, students had to stay in school to accumulate enough courses in an area to be a concentrator, so that the relationship of staying in school to concentrating in vocational education is somewhat tautological. To identify the relationship more clearly, the analyses for 11th and 12th grades were performed including only students who had stayed in school up to that point and dropped out in 11th or 12th grade. Thus, 9th- and 10th-grade dropouts, whose probability of becoming a concentrator in vocational education were lower, were eliminated. The relationship of vocational education to lower dropout rates remained, giving greater confidence to the interpretation that vocational concentrations and vocational survey courses have some "holding power" over students with disabilities.

Work experience. As expected, the grade-level analyses show that student participation in work experience programs had a sizable positive impact on educational outcomes. Although not consistent in magnitude across grade levels, students in work experience programs were estimated to miss 3 fewer days of school ($p<.05$) and be 16 percentage points less likely to fail a class in 11th grade ($p<.01$) than their peers who did not have such experiences. Students in work experience programs were estimated to have a lower probability of dropping out of school by 12th grade (7 percentage points, $p<.01$), perhaps reflecting the Students who spent most of their time in regular education academic classes were estimated to be 10 percentage points more likely to fail a class in 9th grade than peers who spent just half of their time there. Interestingly, this effect is strongest in 9th grade and indirect effects of lower course failure and absenteeism in prior years. Furthermore, the

extended model indicates that school-sponsored and community-based work experience were similar in their relation to lower absenteeism (5 and 6 days, $p<.05$ and $p<.01$) and that participation in community-based programs was strongly related to a lower probability of course failure (Table 5-9). Students taking part in community-based work experience programs were estimated to be 23 percentage points less likely to fail a class than peers who did not, other factors being equal ($p<.05$). Thus, it appears that community-based work experience, in particular, may be associated with both near-term and long-term benefits.

Table 5-9

ESTIMATED CHANGE IN ABSENCES AND COURSE FAILURE ASSOCIATED WITH ENROLLMENT IN WORK EXPERIENCE PROGRAMS

	Average Number of Days Absent	Percentage Failing Classes	For Increment
Time spent by youth in school-based work experience programs	-4.8*	3.1	None vs. more than 75%
Time spent by youth in community-based work experience programs	-6.3**	-22.6*	None vs. more than 75%

* $p<.05$; ** $p<.01$.

Estimates based on an extended model using a subset of 11th- and 12th-grade students (n=368) who had data from the Survey of Secondary School Programs.

Support services. In Chapter 4, we hypothesized that support services provided to students in the form of help from a tutor, reader, or interpreter; personal counseling or therapy; or nonhuman supports in regular education classes (e.g., adaptations to testing procedures) would be related to better school performance. Extended models of school performance lend only some support to this notion. Although the relationships of receiving help from a tutor, reader, or interpreter and receiving counseling or therapy were consistently in the expected direction, only the relationship between receipt of tutoring assistance and absenteeism was statistically significant (Table 5-10). Students who had this form of support were estimated to miss 3 fewer days of school than other students, controlling for other differences between them ($p<.05$). The number of supports offered to students in regular education classes was not related to absenteeism or course failure. Neither were there significant relationships between supports given to teachers and student performance, although three of the four relationships were in the expected direction.

Table 5-10

ESTIMATED CHANGE IN ABSENCES AND COURSE FAILURE ASSOCIATED WITH SUPPORTS OFFERED TO STUDENTS AND TEACHERS

	Average Number of Days Absent	Percentage Failing Classes	For Increment
Supports for students			
Student received counseling	-1.7	-7.9	Yes vs. no
Student received tutoring	-3.1*	-8.3	Yes vs. no
Total number of nonhuman supports offered to student in regular education	2.0	2.8	Yes vs. no
Supports for teachers			
Number of nonhuman supports given regular education teacher	-.6	-6.5	3 supports vs. 1 support
Regular education teacher given support to reduce teacher/student ratio	.7	-3.7	Yes vs. no

* $p<.05$.

Estimates based on an extended model using a subset of 11th and 12th grade students (n=368) who had teacher survey data. The analysis also included a dichotomous variable indicating whether the student was enrolled in any regular education class, to distinguish those who received no support in regular education from those receiving no support because they were not in regular education classes.

School Characteristics

School size. The notion that larger schools are less personal, more difficult to bond with, and more likely to be associated with problematic school performance finds some support in the grade-level analyses (Table 5-8). The size of the school's enrollment was most powerfully and consistently related to the probability of course failure. In 10th grade, for example, students who attended schools with 1,300 students were 5 percentage points more likely to fail a class that year than students who attended schools with enrollments of 700 ($p<.001$). This relationship of size to course failure decreased across the grade levels but remained statistically significant. School size had only a weak relationship to absenteeism, which was significant only in grades 9 and 11 ($p<.10$). There was no relationship to students' dropping out, perhaps because school factors operated indirectly on dropping out, through their relationship to higher absenteeism and course failure.

Low-income student body. The current analyses support the idea that schools with relatively higher proportions of low-income students were linked to poorer performance for students at those schools. Students attending schools with larger proportions of low-income

students were absent somewhat more (2 to 3 days, $p<.05$ and $p<.001$) and more likely to fail a class (2 to 6 percentage points, $p<.10$ for 9th and 10th grades) than peers in schools with smaller proportions of low-income students. Like school size, given other factors in the model, the relative proportion of low-income students was unrelated to the probability of dropping out of school.

Leadership of the principal. The extended models fail to support the assertion that the leadership of the principal directly affects the performance of secondary school students with disabilities (Table 5-11). The coefficients were neither consistent in direction nor statistically significant. This finding supports the notion that factors that are less specific to individual students are weakly related to their performance.

Table 5-11

ESTIMATED CHANGE IN ABSENCES AND COURSE FAILURE ASSOCIATED WITH SCHOOL CLIMATE CHARACTERISTICS

	Average Number of Days Absent	Percentage Failing Classes	For Increment
School leadership has high expectations for students and teachers	-3.1	8.3	Strongly agree vs. strongly disagree
School climate is conducive to learning	1.7	7.9	Strongly agree vs. strongly disagree

Estimates based on an extended model using a subset of 11th- and 12th-grade students (n=368) who had data from the Survey of Secondary School Programs.

School climate. Similar to findings regarding the leadership of the principal, the NLTS measure of school climate was not significantly related to student absenteeism or course failure, suggesting that the performance of individual students is more affected by their personal characteristics and experiences than by environmental factors, such as the general climate of the school.

The implications of these numerous and complex relationships are summarized in the following chapter.

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6 SCHOOL PERFORMANCE: WHAT DO WE KNOW?

This volume has described the school performance of students with disabilities along several dimensions and across grade levels. In addition, it has explored the individual, household, behavioral, and school factors that relate to the school performance of students with disabilities. Here we summarize the findings by addressing the key research questions outlined in Chapter 1.

How did students with disabilities perform in secondary school? Several aspects of performance have been addressed, showing significant deficits in educational performance for many students with disabilities:

- **Absenteeism**. Students with disabilities missed about 3 weeks of school each year. Although levels of absenteeism were relatively constant across the 4 years of secondary school, nearly one-quarter of students with disabilities were absent 4 or more weeks during a given academic year, a higher rate than for students in the general population.
- **Reading and mathematics abilities**. Students with disabilities were, on average, more than 3 years behind grade level in both reading and mathematics when they were last tested. Although 30% of students were 1 year or less behind their grade level in reading ability, virtually the same number were more than 5 years behind. Similarly one-third of students were 1 year or less behind in mathematics, but one-fourth were more than 5 years behind grade level in mathematics.
- **Student behaviors.** About half of 12th-graders with disabilities had teachers who rated their in-class behavior (getting along with others, controlling their behavior, and following directions) as high. Attendance to the tasks of schooling (doing homework, completing assignments on time, participating in classroom discussions) was more likely to be rated in the moderate range. Ratings of student behavior varied widely in different instructional settings for different categories of students, although students were most likely to be rated lower on both dimensions of behavior in regular education academic classes than in special education or vocational courses.
- **Grade performance**. Students with disabilities earned a GPA of 2.3 over the 4 years of secondary school, below the 2.6 GPA for the general population. GPAs for students with disabilities increased marginally over the course of secondary school, from 2.0 in 9th grade to 2.3 in 12th grade. A majority (62%) of students with disabilities who stayed in school for 4 years failed at least one course in their high school careers; course failure contributes to the lack of accumulation of necessary Carnegie units for graduation, and may affect youths' self-image in a negative way. As was the case with GPA, the number of students who failed courses decreased somewhat over time, from 43% failing a class in 9th grade to 23% in 12th grade.

- **Grade retention**. More than 85% of students with disabilities completed each grade level in 2 semesters. Approximately equal numbers required more and less time to complete a grade level.
- **School completion**. Approximately 30% of high school students with disabilities failed to complete their secondary educations; another 8% had dropped out before reaching 9th grade. Dropouts from high school were, on average, 18 years old, but had earned only 10 credits in their years in secondary school.

Which students had particular difficulties with school performance? Difficulties with educational outcomes were not uniformly distributed, but clustered among particular groups of students. Here we summarize performance for students who differed in disability, gender, and ethnic background.

- **Disability category**. Because students with learning disabilities were the largest category of secondary students with disabilities, their difficulties with performance in secondary school color the overall negative picture of educational outcomes. However, not all students experienced similar levels of difficulty.

  In general, students with sensory impairments had better school performance than their peers in other disability categories. Deaf students, for example, had the fewest average absences (11 days), the highest GPA (2.6), the lowest proportion of students who had failed a course (44% over 4 years), and the lowest dropout rate (11%). Hard of hearing students and those with visual impairments also showed strong performance in school, despite the fact that hearing impaired students were an average of 4 years behind grade level in reading and mathematics.

  At the other end of the spectrum, students with serious emotional disturbances were characterized by the greatest number of absences (18 days in most years), the lowest GPA (2.2 cumulatively), the highest cumulative failure rate (77%), the poorest behavior ratings in some settings, and the highest dropout rate (48%). It is interesting to note, however, that students with serious emotional disturbances achieved scores on standardized reading and math measures closer to their grade level designation than peers in most other disability categories, yet their higher abilities were not reflected in other performance measures. Relationships between disability category and performance were constant, even when multivariate analyses controlled for other differences in the abilities and experiences of students.
- **Gender.** Many areas of research have shown that gender plays an important role in many special education and transitional issues. There is further evidence of these differences in students' performances. Although the level of absenteeism was similar for females and males, female students were less likely to fail classes (for example, 38% vs. 45% in 9th grade). When multivariate analyses controlled for other differences between students, males continued to demonstrate a higher probability of course failure and of dropping out than did females.
- **Ethnic background.** This chapter also found ethnic group membership to be related to performance in a number of different ways. White students tended to be absent less than both their African American and their Hispanic peers (for example, 12 vs. 19 days in 9th grade), and they failed classes in smaller numbers than their

African American peers (for example, 36% vs. 56% in 9th grade). Hispanic and white students both achieved higher cumulative GPAs than African American students (2.5 and 2.4 vs. 2.0). However, ethnic group membership is intertwined with household income and school factors. When multivariate analyses controlled for these related differences between students, only course failure was significantly and consistently associated with differences in ethnic background, favoring white students over both African American and Hispanic students.

How did characteristics of students' households relate to their school performance?

- **Household income.** Household income is associated with a number of performance measures. Students whose family income was $25,000 or more had fewer absences (for example, 11 vs. 19 days in 9th grade) and were less likely to fail courses (57% vs. 68% cumulatively) than peers whose families earned less. When multivariate analyses controlled for the confounding effects of ethnic background and other student characteristics and experiences, higher-income students still were shown to miss marginally less school and to be 2 to 3 percentage points less likely to drop out.
- **Two-parent families.** Students from two-parent families missed less school than other students, other differences between them being held constant. No independent relationship to course failure or dropping out was found.
- **Parent involvement.** Parents are important to their children's success in school. NLTS findings confirm the substantial body of research that documents that parents' involvement in their children's education helps their children succeed. Twelfth-grade students whose parents were rated by teachers as more supportive of their children's educational experiences missed less school and were significantly less likely to fail classes than students who had less parental support (e.g., help with homework, attendance at school events), other factors being held constant.

How did students' behavior relate to their school performance? Several aspects of students' behavior are strongly related to their absenteeism, course failure, and dropout experience.

- **Social behaviors.** Belonging to a school or community group, as an indicator of students' engagement in the school community, is powerfully related to all educational outcomes investigated by the NLTS, independent of other differences between students. Group members averaged between 2 and 4 fewer days absent from school, were between 7 and 10 percentage points less likely to fail courses, and were between 3 and 10 percentage points less likely to drop out. In contrast to students who were engaged in school, as indicated by their membership in a school or community group, students who were strongly affiliated with private friendships outside of school missed significantly more school than other students. They also were significantly more likely to fail courses in 9th grade and to have dropped out by 12th grade.

  Prior school performance. Educational outcomes are interrelated. Specifically, high absenteeism is significantly related to higher probabilities of both course failure and dropping out of school. Similarly, failing courses, with the accompanying failure to accumulate credits, contributes powerfully to students' dropping out. Further,

poor educational outcomes are cumulative. Poor performance in one year is the strongest predictor of continued poor performance on the same measure in subsequent years, independent of other factors. For example, students who had failed a course in 9th grade were 35 percentage points more likely to fail a course in 10th grade than students who had passed all their 9th-grade courses.

- **In-class behaviors.** Students varied widely in how they were rated by teachers on abiding by behavioral norms in class and on attending to school-related tasks, such as doing their homework. Independent of other factors, classroom behavior was not related to absenteeism or course failure. Students' attendance to school-related tasks mirrored other aspects of their performance. Twelfth-graders with higher school-task ratings from their teachers also missed significantly less school (4 days) and were significantly less likely to fail classes (29 percentage points) than other students.

What were the characteristics of school programs that helped students with disabilities succeed? Choices among courses and placements significantly affected the educational outcomes of students with disabilities.

- **Placement.** Students with disabilities were more likely to fail when their programs were dominated by regular education academic classes, controlling for other differences between students and their school programs. Students who spent substantial portions of their time in academic classes in regular education settings were more likely to fail classes and had lower GPAs in regular education classes. In 9th grade, for example, students with disabilities who spent six of their seven classes in regular education were 10 percentage points more likely to fail than students who spent only three of their classes in regular education academics, holding constant other differences between them. Receiving nonhuman supports, such as special materials or more time to take tests, did not improve the situation. Regular education academic classes also were the setting in which students with the most significant performance difficulties received the poorest behavior ratings from teachers, perhaps suggesting that their academic problems were reflected in their behavior or that assessments of academic achievement, such as course grades, reflected poor behavior.
- **Vocational education**. Students who concentrated in vocational education or took survey courses in vocational education were less likely to drop out than other students. Even when the analysis was limited to only students who remained in school at least until 11th grade, those whose programs included vocational education were less likely to drop out than students who took no vocational education or prevocational courses only. Students with significant performance difficulties, such as those with learning disabilities or serious emotional disturbances or those of African American background, generally had better behavior ratings in vocational classes than in regular education academic classes.
- **Work experience.** Students who participated in work experience programs performed better in school. Controlling for other differences between them, students who had work experience programs in school missed less school, were less likely to fail courses, and were less likely to drop out of school than other students.

What kinds of schools helped students succeed?

- **Smaller schools were more conducive to success for students with disabilities.** Controlling for other differences in students and their school experiences, those attending larger schools missed significantly more school and were significantly more likely to fail courses than students attending smaller schools. The relationship of school size to dropping out was indirect, through the contribution to poorer attendance and grades. These findings are consistent with the emerging emphasis on restructuring schools so that the anonymity of large schools is broken down and students can connect with adults and other students more effectively.
- **Better school performance was more likely in schools with fewer poor students.** Students attending schools in which less of the student body was poor missed significantly less school and were significantly less likely to fail courses than students in schools with higher concentrations of poor students. This finding supports the targeting of funds for such programs as school restructuring/ improvement and dropout prevention to high-poverty schools as a way of reaching students most at risk of poor school performance and early school leaving.
- **We were unable to identify consistent or significant relationships between student performance and school climate or leadership**, as measured by teacher reports and analyzed for a subsample of students with disabilities. Although these factors may be important influences on students' experiences, the analyses suggest that factors more individual to thets udents, such as their own school program or prior performance, are stronger influences on their performance than more environmental factors, such as school leadership.

These findings raise serious questions about the effectiveness of secondary schools in the late 1980s in meeting the educational needs of students with disabilities and about the directions suggested for reforming those schools in the 1990s. What are the possible effects on students with disabilities of raising academic standards, as specified in recent Goals 2000 legislation? Students with disabilities were already failing in large numbers to meet the academic standards that reformers argue were unacceptably low in the late 1980s. In the absence of concerted efforts to alter curriculum, structure, levels of support, or teaching methods, how will students with disabilities meet even higher standards? Raising standards alone is unlikely to break the cumulative cycle of failure experienced by many students with disabilities in high school.

And what are the possible effects of the related movement to increase academic credit requirements for graduation or extend the amount of time students spend in academic classes? NLTS findings suggest that vocational settings are better suited to many students with disabilities, as indicated by higher teacher ratings of their behavior in those classes. Independent of other factors, occupational vocational students with disabilities were less likely than other students to drop out of school. Yet reform efforts aimed at expanding academic classes, although appropriate for students with postsecondary education goals that require extensive academic course preparation, may limit access to vocational opportunities that are more appropriate for many students with disabilities, who strongly voice employment goals for

after high school rather than postsecondary educational aspirations. A direction that shows potentially greater promise for students with disabilities is embodied in the current draft School to Work Opportunities Act, which supports the incorporation of academic curricula into advanced vocational training at the secondary school level; courswork that would be closely linked to postsecondary vocational training opportunities and eventual employment in high-quality jobs.

Finally, we wonder at the wisdom of extending the principle of guaranteeing students with disabilities an education in the least restrictive environment appropriate to their needs to the extreme of calling for full inclusion of all students in all classes. Regular education academic classes are entirely appropriate for many students with disabilities—perhaps for more students than currently are educated in them. Yet educators, policymakers, advocates, and parents must acknowledge that many students with disabilities find regular education academic classes a difficult setting in which to succeed. Students who spent the majority of their time in regular education academic classes were significantly more likely to fail courses than were students spending less time there. Course failure, in turn, resulted in the failure to accumulate credits toward graduation, requiring that students repeat courses or even whole grade levels. This falling behind peers in the progression through high school had serious negative effects on students, contributing powerfully to a higher likelihood that they would not complete high school. Leaving school without a diploma sets young people with disabilities on a path into adulthood that is significantly associated with poorer postschool outcomes of many kinds.

Educational reform advocates and practitioners will truly have incorporated students with disabilities into their agendas when questions such as these are actively considered in debates regarding the future direction of America's secondary schools.

APPENDIX

SUPPLEMENTAL STATISTICAL TABLES

Appendix Table 1

PARTIAL REGRESSION OR LOGISTIC REGRESSION COEFFICIENTS FOR MULTIVARIATE PERFORMANCE MODELS BY GRADE-LEVEL

	Estimated Change in:											
	Absences (Partial regression coefficients)				Failure (Logistic regression coefficients)				Dropout (Logistic regression coefficients)			
	9	10	11	12	9	10	11	12	9	10	11	12
Disability category												
Emotional disturbance	4.02 **	1.91	1.38	.90	.46 +	.03	.23	.28	.75	.74	.91 *	.89 **
Speech impairments	-1.25	-3.08 +	-1.17	-1.64	-.59 +	-.48	-1.07 **	-.56	.07	.71	.22	-.07
Mild/moderate mental retardation	.91	-.09	-.62	-.80	-.30	-.02	-.31	-.33	.64	.38	.45	.11
Deaf	-3.80 **	-3.38 **	-2.86 *	-2.44 *	-.73 **	-.60 *	-.75 **	-.84 **	-.98	-.37	-.64	-.71
Hard of hearing	-1.62	-2.22 +	-3.06 **	-2.14 +	-.69 **	-.42 *	-.66 **	-.50 +	-.18	-.39	-.21	-.72 +
Visual impairments	-3.26 *	-2.62 *	-2.58 *	-2.39 *	-.90 ***	-1.08 ***	-1.05 ***	-.36	.17	.65	.09	-.65
Orthopedic impairments	-.30	.54	-2.48	-2.77 +	-.74 *	-.89 **	-.85 **	-.69 +	-6.99	-.00	-.15	-1.23 *
Other health impairments	5.51 **	4.07 *	-3.30 *	-3.26 *	-.39	-.06	-.89 **	-.39	-.84	.14	-.15	-.64
Severe impairments	.91	-2.02	-2.53	-4.68 **	-.35	.03	-.91 *	-.78 +	-.70	-.57	.47	-.50
Functional skills												
Functional mental skills scale score	.35 *	-.02	.08	-.10	.08 *	.04	.06	.02	-.18 +	-.00	.02	-.05
Self-care ability score	-.94 **	-.09	-.00	-.14	.14 *	.12	.01	.13	1.52 +	.53 +	.27 +	.41
Demographic characteristics												
Youth was male	.58	-.90	-.07	-.62	.30 *	.35	.22	.07	.06	.64	.73 *	.80 +
Youth was African American	.98	-.07	.38	1.54	.36 *	.35 +	.49 **	.12	-.43	-.39	.08	-.28
Youth was Hispanic	-1.56	-1.37	.70	.79	.69 **	-.17	.60 *	.08	-2.03	.71	.32	.13

Appendix Table 1 (Continued)

	Estimated Change in: Absences (Partial regression coefficients)				Failure (Logistic regression coefficients)				Dropout (Logistic regression coefficients)			
	9	10	11	12	9	10	11	12	9	10	11	12
Household characteristics												
Student was from a single-parent household	-1.12	-2.06 *	-1.71 *	-.35	-.06	.17	-.27	-.25	-.41	-.00	.29	.42
16 Household income (5-category scale)	-.59 **	.15	-.27	-.02	-.06	-.01	.02	.05	-.28 *	-.14	-.13 +	-.06 +
Student behaviors												
Student belonged to a school/community group	-4.25 ***	-2.85 ***	-2.01 ***	-2.44 ***	-.45 ***	-.31 *	-.39 **	-.43 *	-1.08 *	-1.00 **	-1.09 **	1.23 **
Frequency of seeing friends	.68 **	.53 *	.34	NA **	.14	.04	.02	.04	.13	.07	.09	.18 +
Prior school performance												
Student was older than typical age-for-grade	1.81 *	NA	NA	NA	.43 ***	NA	NA	NA	2.09 ***	NA	NA	NA
Average absenteeism	NA	.70 ***	.81 ***	.83 ***	.04	.04 ***	.03 **	.02 *	.04 ***	.05 ***	.04 ***	.07 ***
Student ever failed a class	NA	.35	1.07	1.34 *	NA	1.52 ***	1.19 ***	1.73 **	1.41 **	1.06 *	1.32 ***	1.61 ***

Appendix Table 1 (Concluded)

	Estimated Change in: Absences (Partial regression coefficients)				Failure (Logistic regression coefficients)				Dropout (Logistic regression coefficients)			
	9	10	11	12	9	10	11	12	9	10	11	12
School programs												
Percentage of time in regular education classes	-.03 *	NA	NA	NA **	.01 **	.01 ***	.00 **	.00	.00	.00	.00	.00
Hours in occupational vocational education	-.09	-.04	NA	NA	-.00 ***	-.00	NA	NA	.05	-.07	NA	NA
Student had taken an occupational vocational education class in a previous grade	NA	.78	NA	NA	NA	.06	NA	NA	NA	-.21	NA	NA
Student took a concentration in one or more occupational vocational education content areas	NA	NA	-.29	1.36	NA	NA	.52 +	.57	NA	NA	-1.71 ***	-2.43 ***
Student took survey courses in occupational vocational education	NA	NA	-.59	1.53	NA	NA	.18	.43	NA	NA	-1.48 ***	-1.63 ***
Student participated in a work experience program	NA	NA	-3.07 *	-1.11	NA	NA	-.93 **	-.08	NA	NA	-.68	-.95 **
School characteristics												
Proportion of school population living in poverty	.66	1.39 ***	.45	NA *	.04 +	.13 +	05	-.07	.15	.11	.08	.09
School enrollment	.00 +	.00	.00 ***	NA	.00 **	.00 ***	.00 **	.00 *	.00	-.00	.00	.00

+p < .10
* p < .05
** p < .01
*** p < .001

Appendix Table 2

PARTIAL REGRESSION COEFFICIENTS AND LOGISTIC REGRESSION COEFFICIENTS FOR TEACHER SURVEY MODELS OF ABSENCES AND FAILURES[a]

	Absences (Partial regression coefficients)	Failure (Logistic regression coefficients)
Years behind in reading	.09	-.14*
Years behind in math	-.34	.10
Level of parental involvement in student's secondary school experiences	-1.64*	-.41**
Teacher rating of youth awareness of in-class behavioral norms	-.52	-.01
Teacher rating of youth awareness of academic-task related behaviors	-.73**	-.26***
Time spent by youth in school-based work experience programs	-1.20*	.04
Time spent by youth in school-based work experience programs	-1.56**	-.43*
Student received counseling	-1.68	-.45
Student received tutoring	-3.13*	-.45
Total number of different supports offered to student	.51	.04
Regular education teacher given instructional materials	.29	-.19
Regular education teacher given support from instructional aide	.69	-.21
School leadership has high expectations for students and teachers	-.37	.03
School climate is conducive to learning	.68	.12

[a] Estimates based on an extended model using a subset of 11th and 12th grade students (n=368) who had teacher survey data

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